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Anesth Analg 2009 109: 2025-2027.

# 桡动脉穿刺置管：最新的解剖学和生理学研究

**Radial Artery Cannulation: A Comprehensive Review of Recent Anatomic and Physiologic Investigations**

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.Anesth Analg 2009 109: 1763-1781.

解剖位置容易到达、容易置管、并发症少，以上种种因素使得桡动脉成为置管的最佳选择。桡动脉置管是一项相对安全的操作，缺血并发症只有 0.09%。虽然它的解剖在前臂和手有变异性，但是大部分病人其并行血流足以补偿桡动脉血栓的形成。桡动脉可作为冠状动脉旁路移植术的管道，在手部整形外科中有独特作用以及其可作为心脏导管的置入点，这些都为我们对桡动脉旁路血流和桡动脉操作器械提供了新的视角。改良的 Allen’s 试验已经成为评估尺动脉旁路血流是否充分的最常用的临床方法，尽管它对预测桡动脉闭塞的临床证据尚缺乏。超声多普勒可用来评估手部旁路血流灌注以此分层分析由置管引起的潜在的缺血性损伤。有限的研究表明用肝素冲洗桡动脉导管是有利的，但仅仅是对于长时程监测的病人（>24h）。对于桡动脉置管引起的缺血性并发症，保守治疗和外科干预治疗效果相似。有限的临床经验表明超声引导桡动脉穿刺能提高置管的成功率，这和其能减少穿刺有关。在前瞻性研究中并未证实这种技术是否能减少并发症。尺动脉作为穿刺置管的备选方法的安全性有待进一步研究，因为尺神经比较靠近尺动脉，损伤的潜在风险较高。
（李潺 译 陈杰 校）

Consistent anatomic accessibility, ease of cannulation, and a low rate of complications have made the radial artery the preferred site for arterial cannulation. Radial artery catheterization is a relatively safe procedure with an incidence of permanent ischemic complications of 0.09%. Although its anatomy in the forearm and the hand is variable, adequate collateral flow in the event of radial artery thrombosis is present in most patients. Harvesting of the radial artery as a conduit for coronary artery bypass grafting, advances in plastic and reconstructive surgery of the hand, and its use as an entry site for cardiac catheterization has provided new insight into the collateral blood flow to the hand and the impact of radial arterial instrumentation. The Modified Allen’s Test has been the most frequently used method to clinically assess adequacy of ulnar artery collateral flow despite the lack of evidence that it can predict ischemic complications in the setting of radial artery occlusion. Doppler ultrasound can be used to evaluate collateral hand perfusion in an effort to stratify risk of potential ischemic injury from cannulation. Limited research has demonstrated a beneficial effect of heparinized flush solutions on arterial catheter patency but only in patients with prolonged monitoring (>24 h). Conservative management may be equally as effective as surgical intervention in treating ischemic complications resulting from radial artery cannulation. Limited clinical experience with the ultrasound-guided arterial cannulation method suggests that this technique is associated with increased success of cannulation with fewer attempts. Whether use of the latter technique is associated with a decrease in complications has not yet been verified in prospective studies. Research is needed to assess the safety of using the ulnar artery as an alternative to radial artery cannulation because the proximity and attachments of the ulnar artery to the ulnar nerve may potentially expose it to a higher risk of injury.

# 对接受耻骨切骨术患儿应用连续髂筋膜腔隙阻滞（FIC）较阿片类有更好的术后镇痛效果且副作用少

**Incisional Continuous Fascia Iliaca Block Provides More Effective Pain Relief and Fewer Side Effects than Opioids After Pelvic Osteotomy in Children**

Sandra J. Lako, MD*, Monique A. Steegers, MD*, Jan van Egmond, MSc, PhD*, Jean Gardeniers, MD, PhD†, Lonneke M. Staals, MD*, and Geert J. van Geffen, MD, PhD*
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Anesth Analg 2009 109: 1799-1803.

**背景**：静脉注射阿片类常用于儿童矫形术后的镇痛，但常伴有副作用，如呼吸抑制，呕吐，嗜睡，尿潴留。为验证连续髂筋膜腔隙阻滞（FIC）是否较静注吗啡术后镇痛效果更好且副作用少，作者进行了一项前瞻性随机双盲试验以评估这两种方法。
**方法**：选取 30 名 3 至 6 岁接受耻骨截骨术的患儿（ASA Ⅰ-Ⅱ）入组。这些患儿随机分配至 M 组：静注吗啡、髂筋膜腔隙使用安慰剂（生理盐水）或 R 组：静注安慰剂（生理盐水）、髂筋膜腔隙使用罗哌卡因。所有患儿麻醉方式采用七氟醚和芬太尼的气静全麻。外科医生术中将 FIC 导管置入。手术结束时所有患儿随机静注一定剂量的吗啡（M 组），或 FIC 导管推注 0.75%罗哌卡因。术后，M 组静注 20 $\mu g \cdot kg^{-1} \cdot h^{-1}$ 吗啡；R 组经 FIC 导管中推注 0.2%罗哌卡因 0.1 $mL \cdot kg^{-1} \cdot h^{-1}$ 镇痛。两个组生理盐水由另一独立途径给予。对所有患儿进行评估疼痛，嗜睡程度，术后首次进食时间，及术后的 48 小时内的副作用。在此期间，所有的患儿进行了导尿。
**结果**：完成此项调研的有 28 名患儿。在麻醉恢复室中，M 组患儿疼痛得分较高。这些患儿在此期间也更嗜睡。呕吐的发生率两组间没有显著差异，但 R 组患儿术后首次进食时间明显早于 M 组。一项回顾性研究发现推注罗哌卡因患者尿潴留发生率为 4.7%，而推注吗啡患者尿潴留发生率为 39%。
**结论**：对接受耻骨切骨术患儿应用连续髂筋膜腔隙阻滞（FIC）较静注吗啡提供更好的术后镇痛效果，且嗜睡副作用少，术后食欲恢复更好。
（陈毓雯 译 陈杰 校）

**BACKGROUND:** Intravenous opioid therapy is frequently used for postoperative pain management in children after orthopedic surgery but causes side effects such as respiratory depression, vomiting, sedation, and urinary retention. To investigate whether a continuous incisional fascia iliaca compartment (FIC) block provides more effective postoperative pain relief with fewer side effects than IV morphine, we performed a prospective, double-blind, randomized study to compare both techniques.
**METHODS:** Thirty children (ASA physical status I–II) aged 3 mo to 6 yr undergoing a pelvic osteotomy were included in the study. The children were randomized for either morphine IV and placebo (saline) via a FIC catheter (Group M) or placebo (saline) IV and ropivacaine via a FIC catheter (Group R). All patients received general anesthesia using inhaled sevoflurane and IV fentanyl. Perioperatively, a FIC catheter was placed by the surgeon. All patients received either a bolus dose of morphine IV (Group M) or ropivacaine 0.75% via the FIC catheter (Group R) at the end of surgery. Postoperatively, Group M received morphine IV 20 $\mu g \cdot kg^{-1} \cdot h^{-1}$ and Group R ropivacaine 0.2% 0.1 $mL \cdot kg^{-1} \cdot h^{-1}$ via the FIC catheter. In both groups, saline was

administered along the other route. All children were assessed for pain, sedation, time until first oral intake, and adverse effects for 48 h postoperatively. During this period, all children had a urinary catheter.
**RESULTS:** The study was completed by 28 children. In the anesthetic recovery room, children in Group M had significantly higher pain scores. These children were also significantly more sedated during the study period. The incidence of vomiting did not differ between the groups; however, children in Group R had first oral intake significantly earlier than Group M. A local retrospective study revealed an incidence of urinary retention of 4.7% in the ropivacaine-treated patients and 39% in the morphine-treated patients.
**CONCLUSIONS:** Continuous incisional FIC block provides excellent postoperative pain relief, less sedation, and better return of appetite than morphine IV after pelvic osteotomy in children.

## γ-氨基丁酸 A 型受体（$GABA_A$-$R_s$）α4 亚单位敲除的小鼠能够抵抗异氟烷产生的遗忘性作用

**Gamma-Aminobutyric Acid Type A Receptor Alpha 4 Subunit Knockout Mice Are Resistant to the Amnestic Effect of Isoflurane**

**Vinuta Rau, PhD[*], Sangeetha V. Iyer, BS[†], Irene Oh, BS[*], Dev Chandra, PhD[†],** Neil Harrison, PhD[‡], Edmond I. Eger, II, MD[*], Michael S. Fanselow, PhD[§], Gregg E. Homanics, PhD[†‖], and James M. Sonner, MD[*]
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**背景**：全麻产生多项终点效应，包括制动、催眠、镇静以及遗忘。紧张性抑制通过 $GABA_A$-$R_s$的作用调节着行为效应，并在其中起了主要作用。这些行为效应同时又可被低浓度的麻醉药所抑制（比如催眠和遗忘）。含α4 亚单位的 $GABA_A$-$R_s$在海马和丘脑中的浓度较高，一旦其结合了δ亚单位后，这些受体就可以调节紧张性抑制，而这种调节作用对于低浓度的异氟烷是很敏感的。
**方法**:在这项研究中，作者使用敲除了 $GABA_A$α4 受体的小鼠来评估异氟烷产生的制动、催眠和遗忘效应中 $GABA_A$-$R_s$的α4 亚单位在上述效应中的作用。敲除小鼠和它们的野生型对照组都进行了 3 项行为测试：条件性恐惧（用来评估遗忘），翻正反射的消失（用来评估催眠），以及使 50%个体对于有害刺激无体动的吸入麻醉的最低肺泡有效浓度（用来评估制动）。
**结果**：α4 亚单位遗传失活减少了异氟烷的遗忘效应，对于翻正反射消失的影响最小，而对于制动性没有影响。
**结论**：这些结果支持了这样一种假设：行为动作的不同部位调节着不同的麻醉效应，同时也说明了另一点，包含α4 亚单位的 $GABA_A$-$R_s$在异氟烷产生的遗忘效应中是起着重要调节作用的，而这种遗忘效应主要是针对海马依赖性的陈述性记忆而言的。
（张婷 译 陈杰 校）

**BACKGROUND:** General anesthesia produces multiple end points including immobility, hypnosis, sedation, and amnesia. Tonic inhibition via γ-aminobutyric acid type A receptors ($GABA_A$-Rs) may play a role in mediating behavioral end points that are suppressed by low concentrations of anesthetics (e.g., hypnosis and amnesia). $GABA_A$-Rs containing the α4 subunit are highly concentrated in the hippocampus and thalamus, and when combined with δsubunits they mediate tonic inhibition, which is sensitive to low concentrations of isoflurane.
**METHODS:** In this study, we used a $GABA_A$ α4 receptor knockout mouse line to evaluate the contribution of α4-containing $GABA_A$-Rs to the effects of immobility, hypnosis, and amnesia produced by isoflurane. Knockout mice and their wild-type counterparts were assessed on 3 behavioral tests: conditional fear (to assess amnesia), loss of righting reflex (to assess hypnosis), and the minimum alveolar concentration of inhaled anesthetic necessary to produce immobility in response to noxious stimulation in 50% of subjects (to assess immobility).
**RESULTS:** Genetic inactivation of the α4 subunit reduced the amnestic effect of isoflurane, minimally affected loss of righting reflex, and had no effect on immobility.
**CONCLUSIONS:** These results lend support to the hypothesis that different sites of action mediate different anesthetic end points and suggest that α4-containing $GABA_A$-Rs are important mediators of the amnestic effect of isoflurane on hippocampal-dependent declarative memory.

## 用可视听诊器检测气管导管的位置

**A Visual Stethoscope to Detect the Position of the Tracheal Tube**

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**背景**：气管导管插入支气管可以产生单侧呼吸音。作者制作了可视听诊器，该可视听诊器能实时将声信号快速转换为三维（频率－波幅－时间）彩色图像并能在个人电脑显示且能独立处理两种独立的声音信号。本研究目的是评估可视听诊器是否和听诊一样能监测支气管插管。
**方法**：全身麻醉诱导后，气管导管插入气管，用纤支镜测量切牙到气管隆突之间的距离，一名麻醉医生把气管导管从气管向支气管推进，另外一名麻醉医生听诊呼吸音，以探测气管导管前进每 1cm 双侧呼吸音的变化，同时在胸的左边和右边用心前区听诊器记录两侧呼吸音。然后一名麻醉医生将可视听诊器呼吸音输入个人电脑并处理可视呼吸音，检查双侧呼吸音的变化或消失，比较两者的差异。
**结果**：研究中共有 30 名患者。当听到不规则的呼吸音，气管导管的尖端位于隆突下支气管 0.6 ± 1.2 cm。用可视的听诊器时可视呼吸音的波形出现微小变化时导管位于隆突气管侧 0.4 ± 0.8 cm。当听到单侧呼吸音时，导管位于隆突侧面支气管 2.6 ± 1.2 cm ，而用可视听诊器确定单侧呼吸音时导管位于隆突侧支气管 2.6 ± 1.2 cm ，两者差异不显著。

结论：在气管导管前进的过程中，用可视听诊器捕捉的可视呼吸音波形变化早于用听诊器探测的呼吸音变化。在两组中，当支气管导管的头端前进超过隆突，双侧呼吸音消失。
（刘世文 译 陈杰 校）

**BACKGROUND:** Advancing a tracheal tube into the bronchus produces unilateral breath sounds. We created a Visual Stethoscope that allows real-time fast Fourier transformation of the sound signal and 3-dimensional (frequency-amplitude-time) color rendering of the results on a personal computer with simultaneous processing of 2 individual sound signals. The aim of this study was to evaluate whether the Visual Stethoscope can detect bronchial intubation in comparison with auscultation.
**METHODS:** After induction of general anesthesia, the trachea was intubated with a tracheal tube. The distance from the incisors to the carina was measured using a fiberoptic bronchoscope. While the anesthesiologist advanced the tracheal tube from the trachea to the bronchus, another anesthesiologist auscultated breath sounds to detect changes of the breath sounds and/or disappearance of bilateral breath sounds for every 1 cm that the tracheal tube was advanced. Two precordial stethoscopes placed at the left and right sides of the chest were used to record breath sounds simultaneously. Subsequently, at a later date, we randomly entered the recorded breath sounds into the Visual Stethoscope. The same anesthesiologist observed the visualized breath sounds on the personal computer screen processed by the Visual Stethoscope to examine changes of breath sounds and/or disappearance of bilateral breath sound. We compared the decision made based on auscultation with that made based on the results of the visualized breath sounds using the Visual Stethoscope.
**RESULTS:** Thirty patients were enrolled in the study. When irregular breath sounds were auscultated, the tip of the tracheal tube was located at 0.6 ± 1.2 cm on the bronchial side of the carina. Using the Visual Stethoscope, when there were any changes of the shape of the visualized breath sound, the tube was located at 0.4 ± 0.8 cm on the tracheal side of the carina ($P < 0.01$). When unilateral breath sounds were auscultated, the tube was located at 2.6 ± 1.2 cm on the bronchial side of the carina. The tube was also located at 2.3 ± 1.0 cm on the bronchial side of the carina when a unilateral shape of visualized breath sounds was obtained using the Visual Stethoscope (not significant).
**CONCLUSIONS:** During advancement of the tracheal tube, alterations of the shape of the visualized breath sounds using the Visual Stethoscope appeared before the changes of the breath sounds were detected by auscultation. Bilateral breath sounds disappeared when the tip of the tracheal tube was advanced beyond the carina in both groups.

## 血糖可作为经尿道双极电切手术时液体吸收的标志

**Glucose as a Marker of Fluid Absorption in Bipolar Transurethral Surgery**

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Anesth Analg 2009 109: 1850-1855.

**背景：**在过去，血清钠浓度的降低已用于反映经尿道前列腺电切术（TURP）期间电解质灌注液的吸收量。在经尿道前列腺双极电切术中使用的灌注液里含有多种电解质，这导致了血清钠浓度测定法不够准确。在这项研究中，研究者调查了血糖是否可用于反映 TURP 过程中灌注液的吸收量。
**方法：**250例接受单极电切术的患者中测定血糖和血钠浓度，术中使用1.5%甘氨酸或5%葡萄糖溶液作为膀胱灌洗液。10名志愿者进行了葡萄糖动力学分析，这些志愿者们用含1%葡萄糖的醋酸林格氏液为灌注液以20mL/kg 灌注30分钟。这些数据再由电脑模拟不同的吸收模式总结出血糖水平和灌注液管理之间的的关系图。
**结果：**从统计学角度看，在以5%葡萄糖溶液为灌注液的 TURP 术中血清钠的降低与血糖的升高之间存在反线性关系($r^2$ = 0.80)。在灌注试验中葡萄糖浓度从4.6（sd0.4）升高至8.3（0.9）mmol / L。无论哪种吸收模式，所有的模拟分析表明，使用1升含1%葡萄糖的灌注液对应的术毕血糖水平的提高量为3.7（sd1.6）mmol /L，而2升产生的增加量为6.9（1.7）mmol / L。
**结论：**以1%葡萄糖为灌注液行经尿道前列腺双极电切术术中，患者血糖浓度的增加与测定血钠浓度的方法一样可以作示踪剂用来反映灌注液的吸收量。
（丁俊云 译 陈杰 校）

**BACKGROUND:** Historically, a reduced serum sodium concentration has been used to diagnose absorption of electrolyte-free irrigating fluid during transurethral resection of the prostate (TURP). In bipolar TURP, the irrigating solution contains electrolytes, thus invalidating the serum sodium method. In this study, we investigated whether glucose can be used to diagnose the absorption of irrigating fluid during TURP procedures.
**METHODS:** The serum glucose and sodium concentrations were measured in 250 patients undergoing monopolar TURP using either 1.5% glycine or 5% glucose for urinary bladder irrigation. The glucose kinetics was analyzed in 10 volunteers receiving a 30-min infusion of 20 mL/kg of acetated Ringer's solution with 1% glucose. These data were then used in computer simulations of different absorption patterns that were summarized in a nomogram for the relationship between the glucose level and administered fluid volume.
**RESULTS:** There was a statistically significant inverse linear relationship between the decrease in serum sodium and the increase in glucose levels after absorption of 5% glucose during TURP ($r^2$ = 0.80). The glucose concentration increased, from 4.6 (sd 0.4) to 8.3 (0.9) mmol/L, during the experimental infusions. Regardless of the absorption pattern, all simulations indicated that the uptake of 1 L of fluid containing 1% glucose corresponded to an increase in the glucose level of 3.7 (sd 1.6) mmol/L at the end of surgery, whereas 2 L yielded an increase of 6.9 (1.7) mmol/L.
**CONCLUSIONS:** In bipolar TURP, the addition of glucose to a concentration of 1% in the electrolyte-containing irrigation fluid can be used as a tracer of absorption that is comparable with measuring serum sodium after monopolar TURP.

## 困难面罩通气

**Difficult Mask Ventilation**

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Anesth Analg 2009 109: 1870-1880.

面罩通气是气道管理中最基本的技能。在此综述中，研究者总结了有关面罩通气困难（DMV）的知识。在文献中有关 DMV 有各种不同的定义。缺乏确切的标准定义给研究 DMV 带来一些困难，导致数据交流和对比的混乱。DMV 的发生与技术相关和/或气道相关。通常，各种发病机制及这些因素相互作用并最终导致 DMV。DMV 的发生率差异很大（从 0.08% 到 15%），取决于其使用的标准定义。肥胖，年龄大于 55 岁，打鼾，缺牙，胡子的存在，Mallampati 分级 III 或 IV 级，下颌前突试验异常这些都是 DMV 的独立的预测因素。因此，术前评估中应该认识到并记录这些迹象。在婴幼儿 DMV 更具挑战性，因为他们出现低氧血症比成人快的多。最后，DMV 的患者发生气管插管困难的机会更加频繁。因此，临床医生面临具有挑战性的面罩通气困难或者无效的时候，应该熟悉对此的纠正措施和管理方法。
（舒慧刚 译 陈杰 校）

Mask ventilation is the most fundamental skill in airway management. In this review, we summarize the current knowledge about difficult mask ventilation (DMV) situations. Various definitions for DMV have been used in the literature. The lack of a precise standard definition creates a problem for studies on DMV and causes confusion in data communication and comparisons. DMV develops because of multiple factors that are technique related and/or airway related. Frequently, the pathogenesis involves a combination of these factors interacting to cause the final clinical picture. The reported incidence of DMV varies widely (from 0.08% to 15%) depending on the criteria used for its definition. Obesity, age older than 55 yr, history of snoring, lack of teeth, the presence of a beard, Mallampati Class III or IV, and abnormal mandibular protrusion test are all independent predictors of DMV. These signs should, therefore, be recognized and documented during the preoperative evaluation. DMV can be even more challenging in infants and children, because they develop hypoxemia much faster than adults. Finally, difficult tracheal intubation is more frequent in patients who experience DMV, and thus, clinicians should be familiar with the corrective measures and management options when faced with a challenging, difficult, or impossible mask ventilation situation.

## 紧急经皮气道建立术的气道损伤：对比环甲穿刺气管插管

**Airway Injury During Emergency Transcutaneous Airway Access: A Comparison at Cricothyroid and Tracheal Sites**

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Anesth Analg 2009 109: 1901-1907.

**背景：**在紧急情况下可能需要经环甲膜穿刺供氧（CTM），同样在气管插管困难患者中也可能需要此技术。在这项研究中，作者运用不同的气道建立技术比较气管插管与经环甲膜穿刺引起气道损伤的差异。
**方法：**麻醉医师运用 4 种气道建立技术对离体猪气管进行插管。技术 1）运用钢丝导丝引导插管（WGT），2）套管引导（TT），3）套管针引导（NCT），4）气管切开插管（ST）。参与者分别运用每一项技术进行环甲膜穿刺插管和气管插管并进行损伤评估。
**结果：** 环甲膜穿刺插管的样本损伤为 8/40；气管插管的损伤为 27/40。在 TT 组和 ST 组中，气管插管损伤均大于环甲膜穿刺插管($P = 0.02$)，在 NCT 组和

WGT 组并非如此。气管插管中的损伤 ST 组 (9 of 10) = TT 组 (9 of 10) > WGT 组 (6 of 10) > NCT 组 (3 of 10) (*P* = 0.02,发生率最高与最低相比)。但不同组在环甲膜穿刺插管的气道损伤中未见明显差别。气管插管的后期损伤发生高低排序为 TT 组 (9 of 10) = ST 组 (9 of 10) > WGT 组 (5 of 10) > NCT 组 (2 of 10) (*P* = 0.005, 发生率最高与最低相比)。 穿透伤发生高低排序为 ST 组(6 of 10) = TT 组 (6 of 10) > WGT 组(2 of 10) > NCT 组 (1 of 10) (*P* = 0.057, 发生率最高与最低相比)。在气道侧壁，浅表以及穿孔损伤的发病率没有明显差异。在气管插管中环状软骨骨折发生更常见（(15 of 40 对比于 0 of 40, *P* < 0.001)，同时其发生率在插管技术间也有不同。在骨折的发生率依次为 ST 组（6 of 10）>WGT（10 of 5）>TT 组（4 of 10>NCT 组（0 0f 10）（P = 0.011，最高到最低）。

**结论**：气管插管相较于环甲膜穿刺插管的气道损伤及管腔受压更为普遍。ST 和 TT 的气道伤害发病率最高。紧急情况下建立气道，环甲膜穿刺有定位困难的可能。

（叶乐 译 陈杰 校）

**BACKGROUND:** Oxygenation via the cricothyroid membrane (CTM) may be required in emergencies, but inadvertent tracheal cannulation may occur. In this study, we compared airway injury between the tracheal and CTM sites using different techniques for airway access.

**METHODS:** Anesthesiologists performed 4 airway access techniques on excised porcine tracheas. The techniques were 1) wire-guided (WGT), 2) trocar (TT), 3) needle cannula (NCT), and 4) surgical—scalpel with endotracheal tube (ST). Participants performed each technique at both the CTM and tracheal sites. Specimens were assessed for injury.

**RESULTS:** Injury was observed in 8 of 40 and 27 of 40 specimens at the CTM and tracheal sites, respectively (*P* < 0.001). Injury was more frequent at the tracheal site compared with the CTM in both the TT and ST groups (*P* = 0.02) but not for the NCT and WGT. The rank order for any injury at the tracheal site was ST (9 of 10) = TT (9 of 10) > WGT (6 of 10) > NCT (3 of 10) (*P* = 0.02, highest versus lowest), whereas there was no difference in injury at the CTM. The rank order for posterior injury at the tracheal site was TT (9 of 10) = ST (9 of 10) > WGT (5 of 10) > NCT (2 of 10) (*P* = 0.005, highest versus lowest). The rank order for penetrating injury at the tracheal site was ST (6 of 10) = TT (6 of 10) > WGT (2 of 10) > NCT (1 of 10) (*P* = 0.057, highest versus lowest). There was no difference in the incidence of lateral, superficial, or perforating injuries among sites and techniques. Fractures were more common at the tracheal site (15 of 40 vs 0 of 40, *P* < 0.001) and differed by technique. The rank order of fracture incidence at the tracheal site was ST (6 of 10) > WGT (5 of 10) > TT (4 of 10) > NCT (0 of 10) (*P* = 0.011, highest to lowest). Compression of >50% was seen in 10 of 40 vs 28 of 40 (*P* < 0.001) specimens at the CTM and tracheal sites, respectively. The rank order of compression of >50% of airway lumen for both sites was TT > ST > WGT > NCT (*P* = 0.03, *P* < 0.001, CTM and tracheal sites, respectively, highest versus lowest).

**CONCLUSION:** Airway injury and luminal compression were more common at the tracheal site than at the CTM. The ST and TT were associated with the highest incidence of injury. This has implications for emergency airway access in cases in which it may be difficult to accurately identify the CTM.

## 连续静注瑞芬太尼在分娩镇痛中的疗效与安全性：205 位产妇的开放性研究

**The Efficacy and Safety of Continuous Intravenous Administration of Remifentanil for Birth Pain Relief: An Open Study of 205 Parturients**

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Anesth Analg 2009 109: 1922-1924.

在这一观测研究中，作者评估了瑞芬太尼在205例产妇中的疗效及安全性。研究中瑞芬太尼采用持续输注。最初输注速度为0.025 μg · $kg^{-1}$ · $min^{-1}$，并逐步增加，最高为0.15μg · $kg^{-1}$ · $min^{-1}$。记录产妇疼痛，产妇和胎儿的其他变量，副作用及满意度。开始输液前平均（±标准差）视觉模拟评分为9.4 ± 1.2cm，5min 后下降至5.1 ± 0.4cm 和30min 后为3.6 ± 1.5cm。产妇副作用很小，并无胎儿或新生儿副作用记录。
（张磊 译 陈杰 校）

In an observational study, we prospectively evaluated the efficacy and safety of remifentanil in 205 parturients. Remifentanil was administered as a continuous infusion. The initial infusion of 0.025 μg · $kg^{-1}$ · $min^{-1}$ was increased in a stepwise manner to a maximum dose of 0.15 μg · $kg^{-1}$ · $min^{-1}$. Maternal pain, other maternal and fetal variables, side effects, and satisfaction were recorded. The mean (±sd) visual analog score before the start of the infusion was 9.4 ± 1.2 cm and decreased to 5.1 ± 0.4 cm after 5 min and 3.6 ± 1.5 cm after 30 min. The maternal side effects were minimal and no fetal or neonatal side effects were noted.

## 9. 羟基廿碳四烯酸大在大脑小动脉收缩和异丙酚抑制作用中的机制

**The Role of 20-Hydroxyeicosatetraenoic Acid in Cerebral Arteriolar Constriction and the Inhibitory Effect of Propofol**

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Anesth Analg 2009 109: 1935-1942.

**背景**：作者开展了这项实验来研究羟基廿碳四烯酸(20-HETE)是否通过超氧化物引起脑实质小动脉收缩以及异丙酚是否能抑制此收缩。
**方法**：用计算机辅助显微镜来检测电刺激和羟基廿碳四烯酸对大鼠大脑切片的影响。部分试验中加入钠通道阻滞剂河豚毒素，或 20-HETE 抑制剂 HET0016，或超氧化物清除剂，或钛试剂，NADPH 氧化酶抑制剂 DPI 和 gp91ds-tat 或异丙酚。通过荧光探针和细胞色素 c、过氧化氢酶系统的减少来分别评估有无应用上述试剂的大脑切片中超氧化物产生率。
**结果**：电刺激诱发脑实质小动脉的收缩，可被河豚毒素， HET0016，钛试剂，NADPH 氧化酶抑制剂（DPI）所阻断。羟基廿碳四烯酸(10–8–10–6 mol/L)导致

的动脉收缩可被钛铁试剂 NADPH 氧化酶抑制剂（DPI）抑制。异丙酚可减少电刺激和羟基廿碳四烯酸引起的动脉收缩。在大脑切片中显示钛铁试剂，嵌合肽抑制物（gp91ds-tat）和异丙酚能还原羟基廿碳四烯酸诱导形成的超氧化物。然而，异丙酚不能改变未用上述试剂的大脑切片中超氧化物的产生率。
**结论：**无论是神经源性的还是外源性的羟基廿碳四烯酸都能通过 NADPH 氧化酶激活超氧化物引起脑实质动脉收缩。异丙酚可能通过抑制 NADPH 氧化酶来阻止此收缩，而不是通过其清除超氧化物来抑制收缩。
（杨秋娟 译 陈杰 校）

**BACKGROUND:** We conducted this study to examine, in cerebral parenchymal arterioles, whether 20-hydroxyeicosatetraenoic acid (20-HETE) induces constrictor responses via superoxide and whether propofol reduces this constriction.
**METHODS:** Electrical field stimulation or 20-HETE was applied to rat brain slices monitored by computer-assisted microscopy. In some experiments, a $Na^+$ channel antagonist tetrodotoxin, a 20-HETE synthesis inhibitor HET0016, a superoxide scavenger, Tiron, nicotinamide adenine dinucleotide phosphate (NADPH) oxidase inhibitors diphenyleneiodonium (DPI) and gp91ds-tat, or propofol was added. The superoxide level in the brain slice and the production rate in the absence of slices were evaluated by dihydroethidium fluorescence or cytochrome *c* reduction with a superoxide-generating system, respectively.
**RESULTS:** Electrical stimulation induced constriction of the cerebral parenchymal arteriole, whereas this response was abolished by tetrodotoxin, HET0016, Tiron, or DPI. 20-HETE ($10^{-8}$–$10^{-6}$ mol/L) produced arteriolar constriction, which was inhibited by Tiron or DPI. Propofol reduced the constriction induced by electrical stimulation or 20-HETE. 20-HETE induced superoxide production in the brain slice, which was reduced by Tiron, gp91ds-tat, or propofol. However, propofol did not alter the superoxide production rate in the absence of brain slices.
**CONCLUSIONS:** Either neuronal transmission-dependent or exogenous 20-HETE seems to induce cerebral parenchymal arteriolar constriction via superoxide production resulting from NADPH oxidase activation. Propofol is likely to prevent this constriction via inhibition of NADPH oxidase, but not by its scavenging effect on superoxide.

## 经皮尼古丁贴剂不影响吸烟患者术后疼痛处理：剂量范围的初步研究

**A Transdermal Nicotine Patch Is Not Effective for Postoperative Pain Management in Smokers: A Pilot Dose-Ranging Study**

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Anesth Analg 2009 109: 1987-1991.

**背景：**动物模型中尼古丁已被证实有抗伤害作用。对于人类的镇痛作用已进行了研究，但结果较为复杂。其中一个因素是慢性尼古丁暴露在吸烟人群和二手烟人群存在分歧。在这项研究中，作者研究尼古丁贴剂对吸烟患者的术后镇痛的影响。先前已有非吸烟患者中研究。
**方法：**28 例进行腹部或盆腔手术的病人中进行了一项随机、双盲、前瞻性、有安慰剂对照的试验，这些病人都需要自控镇痛及住院一晚。麻醉诱导前，使用一尼古丁贴剂（0，5，10，或 15mg）。主要结果变量为术后疼痛报告，在第一

个小时，及未来 5 天使用标准的数字等级量表。次要结果的变量是止痛药的使用，血流动力学值，恶心和镇静。
**结果**：在手术后第一个小时使用尼古丁贴剂的患者较安慰剂患者有更高的疼痛评分（P<0.01，平均数字评定量表增值= 0.67）。而在随后的 5 天中两组无差异（P>0.05 ）。没有明显的剂量效应。术后第一个小时舒张压，安慰剂组高于尼古丁治疗组（P<0.01，平均增值= 11 mm Hg）。在恶心或镇静方面无差异。
**结论**：吸烟患者应用尼古丁贴剂（5-15mg）未能减轻术后疼痛或减少阿片类药物使用。
（张蕾 译 陈杰 校）

**BACKGROUND:** Nicotine has an antinociceptive effect in animal models. The analgesic effect in humans has been examined, but studies have had mixed results. A proposed etiology is variability in chronic nicotine exposure because of differences in tobacco smoking rates and second-hand smoke exposure. In this study, we examined the postoperative analgesic effect of a transdermal nicotine patch in smokers in a parallel design to a previous study in nonsmokers.
**METHODS:** We conducted a randomized, double-blind, prospective, placebo-controlled trial of 28 patients undergoing abdominal or pelvic surgery who required patient-controlled analgesia and an overnight hospital stay. Before anesthetic induction, a transdermal nicotine patch was applied (0, 5, 10, or 15 mg). The primary outcome variable was postoperative pain reported over the first hour and over the next 5 days using a standard numerical rating scale. Secondary outcome variables were pain medication use, hemodynamic values, nausea, and sedation.
**RESULTS:** Patients treated with nicotine reported higher pain scores than those treated with placebo over the first hour after surgery ($P < 0.01$, average numerical rating scale increase = 0.67) and there was no difference between groups in the subsequent 5 days ($P > 0.05$). There was no significant dose effect. Diastolic blood pressure in the first hour was higher in the placebo group compared with the nicotine-treated group ($P < 0.01$, average increase = 11 mm Hg). There was no difference in nausea or sedation.
**CONCLUSIONS:** Transdermal nicotine, 5–15 mg, failed to relieve postoperative pain or reduce opioid use in smokers.

## 单次肌间沟法臂丛阻滞后颈浅丛神经病变

**Superficial Cervical Plexus Neuropathy After Single-Injection Interscalene Brachial Plexus Block**

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Anesth Analg 2009 109: 2008-2011.

**背景**：使用改良外侧径路肌间沟臂丛神经阻滞法（ISB）能为肩部手术病人提供确切的麻醉与镇痛。考虑到注射部位的神经解剖，颈浅丛有损伤的风险。作者评估了颈浅丛神经病变的发生率和病变特征。
**方法**：在一年之间，作者研究了连续 273 名接受单次 ISB 行肩部及上臂手术患者。在术前、术后 24 小时对这些病人进行与颈浅丛损伤相关的症状的检查，并在术后 31 天进行电话联系。有症状的病人术后再接受为期 6 月的电话联系。

**结果**：肩部手术术后 24 小时，21 位患者（7.7%）表现出与颈浅丛损伤一致的症状。包括与颈浅丛 1-4 皮支对应的感觉减退。5 位患者（1.8%）称症状持续超过 31 天。所有症状均在 6 月后得以缓解。
**结论**：使用改良外侧径路 ISB 后（发生）颈浅丛神经病变并不罕见，应预先与病人讨论这种可能性（告知风险）。
（邹巧群 译 陈杰 校）

**BACKGROUND:** Interscalene brachial plexus block (ISB) using the modified lateral approach provides a well-established method of anesthesia and analgesia for patients undergoing shoulder surgery. Considering the neural anatomy at the site of injection, the superficial cervical plexus may be at risk of injury. We evaluated the incidence and characteristics of superficial cervical plexus neuropathy.
**METHODS:** During a 1-yr period, 273 consecutive patients requiring single-injection ISB for shoulder or proximal arm surgery were studied. Patients were examined for symptoms compatible with superficial cervical plexus injury before surgery, 24 h postoperatively, and contacted by telephone 31 days after surgery. Symptomatic patients received an additional phone call 6 mo after surgery.
**RESULTS:** Twenty-four hours after shoulder surgery, 21 patients (7.7%) showed symptoms consistent with superficial cervical plexus neuropathy. Symptoms consisted of hypesthesia in 1–4 cutaneous branches of the cervical plexus. Five patients (1.8%) reported symptoms that lasted for >31 days. All symptoms had entirely resolved after 6 mo.
**CONCLUSIONS:** Superficial cervical plexus neuropathy is not uncommon after ISB using the modified lateral approach and the possibility should be discussed with patients preprocedurally.

## 在一个乡村眼科营地深局部和表面结膜下联合麻醉用于囊外白内障摘除术

## Combined Deep Topical and Superior Subconjunctival Anesthesia for Extracapsular Cataract Extraction in a Rural Eye Camp

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Anesth Analg 2009 109: 2025-2027.

**背景**：眼科营地的白内障手术麻醉要求简单、 安全、有效。
**方法**：在泰国的一个乡村眼科营地作者对 98 名行白内障摘除术的患者进行了研究。白内障摘除术及人工晶状体植入术（白内障/人工晶体)患者在深局部联合结膜下阻滞麻醉。行眼内乳化晶状体植入术（超声乳化/人工晶体) 患者接受表面麻醉。记录疼痛视觉模拟评分、 麻醉手术并发症、 手术时间及其他药物治疗。
**结果**：白内障/人工晶体组和超声乳化/人工晶体组患者平均年龄分别为 68.7 和 67.5 岁，手术时间在 16.1 ± 6.7 和 12.0 ± 4.7 min， 疼痛评分在 30.5 mm (12.3 – 54.6 mm) 与 20.0 mm (9.0 – 45.9 mm) 的。超声乳化/人工晶体组中出现了三例后囊破裂。不需要任何额外的麻醉。无麻醉并发症的发生。
**结论**：在乡村眼科营地，深局部麻醉联合结膜下阻滞麻醉和表面麻醉分别能为白内障/人工晶体植入术和超声乳化/人工晶体植入提供有效的麻醉。

（唐颖 译 陈杰 校）

**BACKGROUND:** Anesthesia for cataract surgery at eye camps needs to be simple, safe, and effective.
**METHODS:** We prospectively studied 98 patients undergoing cataract extraction in a rural eye camp in Thailand. Patients undergoing extracapsular cataract extraction with intraocular lens implantation (ECCE/IOL) received deep topical anesthesia with subconjunctival anesthesia. Patients undergoing phacoemulsification with intraocular lens implantation (Phaco/IOL) received topical anesthesia. Pain visual analog score, operative and anesthetic complications, operative time, and additional medications were recorded.
**RESULTS:** A mean age of 68.7 vs 67.5 yr, an operative time of 16.1 ± 6.7 min vs 12.0 ± 4.7 min, and a median (interquartile range) pain score of 30.5 mm (12.3–54.6 mm) vs 20.0 mm (9.0–45.9 mm) were seen in the ECCE/IOL and Phaco/IOL groups, respectively. Three cases of ruptured posterior capsule occurred in the Phaco/IOL group. No additional anesthesia was needed. No anesthetic complications occurred.
**CONCLUSION:** In a rural eye camp, deep topical anesthesia with subconjunctival anesthesia for ECCE/IOL and topical anesthesia for Phaco/IOL provide effective anesthesia for cataract surgery.

## 在心肺转流术期间温度治疗方法和神经保护的核心综述：是否与复温速率有关系？

## A Core Review of Temperature Regimens and Neuroprotection During Cardiopulmonary Bypass: Does Rewarming Rate Matter?

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Anesth Analg 2009; 109:1741-1751

虽然临床医生和基础科学家进行了半个世纪研究及采取了多种减少风险的方案，但是心脏手术病人仍然继续遭受着与使用心肺转流相关的中风和认知功能障碍。减少那些不利影响一个对策是：使用低温。尽管大量研究报告都讨论了这个问题，但是，在心肺转流期间采用低温能否减少对中枢神经系统不良影响，这还不得而知。然而，数据清楚表明：围术期应避免高温，如果在心肺转流期间已经使用了低温，需要谨慎采用复温策略。选择体温监测部位并了解体温监测部位的影响，这对精确评估大脑温度和避免大脑温度的意外骤升有重要意义。在本文中，我们对有关在心脏手术期间低温和复温速率的影响的文献进行了综述。

（王海涛 译 马皓琳 李士通 校）

Despite a half century of research and the implementation of various risk-reduction strategies among clinicians and basic scientists, patients continue to experience strokes and cognitive dysfunction related to the use of cardiopulmonary bypass (CPB) for cardiac surgery. One strategy to reduce these detrimental effects has been the use of hypothermia. Although numerous studies have addressed the issue, the question of whether the use of hypothermia during CPB attenuates the impact of central nervous system consequences remains unresolved. However, data clearly demonstrate that hyperthermia is to be avoided in the perioperative period,

necessitating careful rewarming strategies if hypothermia is used during CPB. Selecting and understanding the impact of the temperature-monitoring site is important to accurately estimate cerebral temperature and to avoid inadvertent surges in brain temperature. In this article, we review the literature regarding the impact of hypothermia and rewarming rates during cardiac surgery.

## 心脏麻醉：30 年后——第二年度 Arthur E. Weyman 演讲

**Cardiac Anesthesia: Thirty Years Later—The Second Annual Arthur E. Weyman Lecture**

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Anesth Analg 2009; 109:1782-1790

心脏麻醉学在过去 30 年有着特殊的发展，从重点关注对心血管疾病患者的麻醉处理的实践转变到有助于医疗和手术治疗心血管疾病患者的心血管药物的实践。第二 Weyman 演讲回顾了这一历史、心血管麻醉师协会在专业发展领域的重要角色、专业持续发展、社会和他们所关心的患者的前景。
（彭中美 译 马皓琳 李士通 校）

Cardiac anesthesiology has evolved spectacularly over the past 30 yr, changing from a practice focused on the anesthetic management of patients with cardiovascular diseases to a practice of cardiovascular medicine that contributes to the medical and surgical management of cardiovascular patients. The second Weyman lecture reviews this history, the critical role of the Society of Cardiovascular Anesthesiologists in the evolution of the specialty, and the prospects for continued development for the specialty, the society, and the patients they care for.

## 全身性用利多卡因可减少门诊外科手术后围术期阿片类止痛剂的需要量但不能缩短出院时间

**Systemic Lidocaine Decreased the Perioperative Opioid Analgesic Requirements but Failed to Reduce Discharge Time After Ambulatory Surgery**

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Anesth Analg 2009; 109:1805-1808

背景：在本次随机、盲法、安慰剂对照研究中，我们评估了全身性用利多卡因能否减少门诊外科患者的疼痛和出院时间。
方法：67 名患者被分为围术期注射利多卡因或盐水。
结果：麻醉后恢复室(PACU)停留时间两组间没有差异。在 PACU 和整个研究期间，术中阿片类药物的使用在利多卡因组明显减少，但出院后则不是。在

PACU，利多卡因组患者主诉疼痛较轻（直观类比标度 3.1 ± 2.04 比 4.5 ± 2.9; $P = 0.043$）。术后恶心呕吐两组间没有差异。
结论：围术期全身性用利多卡因明显减少日间手术阿片类药物的需求量且不影响出院时间。
（唐李隽 译 马皓琳 李士通 校）

**BACKGROUND:** In this randomized, blinded, placebo-controlled trial, we evaluated whether systemic lidocaine would reduce pain and time to discharge in ambulatory surgery patients.
**METHODS:** Sixty-seven patients were enrolled to receive lidocaine or saline infusion perioperatively.
**RESULTS:** Length of postanesthesia care unit (PACU) stay did not differ between groups. Intraoperative opioid use was significantly less in the lidocaine group, both in the PACU and during the total study period but not after discharge. In the PACU, patients in the lidocaine group reported less pain (visual analog scale score 3.1 ± 2.04 vs 4.5 ± 2.9; $P = 0.043$). There were no differences in postoperative nausea and vomiting.
**CONCLUSION:** Perioperative systemic lidocaine significantly reduces opioid requirements in the ambulatory setting without affecting time to discharge.

## 急性等容血液稀释中每搏量变异

**Stroke Volume Variation During Acute Normovolemic Hemodilution**

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Anesth Analg 2009; 109:1823-1830

**背景：**手术病人的血容量应最好控制在避免水中毒和复苏低下引起的并发症。我们研究术中急性等容血液稀释的病人中基于由动脉压测算心输出量（CO）监测系统(FloTrac/VigileoTM, Edwards Lifesciences, Irvine, CA)的每搏输出量变异度（SVV）是否能跟踪血液去除和置换引起的变化。我们进一步评估了 SVV 和 3 维（3D）经食道超声心动图（TEE）左心室容量测定值之间的相关性。
**方法：**选取 25 例计划在术中进行急性等容血液稀释的病人。定义 7 个测量时间点：基线、去除估计血容量（EBV）的 5%、10%、15%后、及用等量的 6%羟乙基淀粉置换至估计血容量的–10%、–5%和基线后。在每个时点，从标准监护仪得到心率、收缩压、舒张压和动脉平均压，从 FloTrac/Vigileo 监护仪得到 CO 和 SVV 测定值，并记录 TEE 图像用于随后的离线重建以及左心室收缩末期和舒张末期容量的测定。为了统计，我们使用混合模型方差分析和 Dunnett’s 检验来分析基线值和后来数据的比较。用 Pearson’s 相关性分析检查 SVV 和左心室容量之间的关系。
**结果：**方差分析显示研究过程中心率和平均动脉压没有显著变化。去除 15%的估计血容量后 CO 从 4.9 ± 0.3 L/min 降低至 4.5 ± 0.3 L/min，置换 15%的估计血容量后又最后上升至 5.4 ± 0.3 L/min。去除 15%的估计血容量后 SVV 从 9.2% ± 0.9%上升至 20.3% ± 2.0% ($P < 0.001$)，置换 15%的估计血容量后最后恢复至 7.2% ± 0.9%。去除 15%的估计血容量后左心室舒张末期容量从 42.1 ± 8.3 mL/m2 降低至 36.9 ± 8.3 mL/m2 ($P < 0.001$)，置换 15%的估计血容量后最

后回到 45.9 ± 10.3 mL/m2。SVV 测量值与 3D TEE 测量的左心室容量值呈负相关。
**结论：**血液稀释过程中由 FloTrac/Vigileo 系统得到的 SVV 在血液去除和置换时显著变化。这些变化与 3D TEE 测得的左心室容量值相关。SVV 在指导优化血管内容量的作用还有待进一步研究。
(朱 慧译 马皓琳 李士通校)

**BACKGROUND:** The intravascular volume of surgical patients should be optimized to avoid complications associated with both overhydration and underresuscitation. In patients undergoing intraoperative acute normovolemic hemodilution, we investigated whether stroke volume variation (SVV) derived from an arterial pressure-based cardiac output (CO) monitor system (FloTrac/VigileoTM, Edwards Lifesciences, Irvine, CA) tracked the changes associated with blood removal and replacement. We further evaluated the correlations between SVV and 3-dimensional (3D) transesophageal echocardiographic (TEE) left ventricular (LV) volume measurements.
**METHODS:** Twenty-five patients had procedures during which acute normovolemic hemodilution was a planned part of the intraoperative management. We defined 7 measurement timepoints: baseline, after the removal of 5%, 10%, and 15% of the estimated blood volume (EBV) and after replacement with an equal volume of 6% hetastarch to –10%, –5%, and baseline EBV. At each timepoint, heart rate and systolic, diastolic, and mean arterial blood pressure were obtained from standard monitors, CO and SVV measurements were obtained from the FloTrac/Vigileo monitor, and TEE images were recorded for subsequent off-line reconstruction and determination of LV end-systolic and end-diastolic volumes. For statistical evaluations, we used a mixed models analysis of variance and Dunnett's test for *post hoc* comparisons with baseline values. Pearson's correlation was used to examine the relationships between SVV and LV volume.
**RESULTS:** Analysis of variance demonstrated no significant change in heart rate or mean arterial blood pressure over the duration of study. CO decreased from 4.9 ± 0.3 to 4.5 ± 0.3 L/min after removal of 15% of the EBV and then increased to a final value of 5.4 ± 0.3 L/min after replacement of 15% of the EBV. SVV increased from 9.2% ± 0.9% to 20.3% ± 2.0% ($P < 0.001$) after removal of 15% of the EBV and returned to a final value of 7.2% ± 0.9% after replacement of 15% of the EBV. The indexed LV end-diastolic volume decreased from 42.1 ± 8.3 to 36.9.3 ± 8.3 mL/m2 ($P < 0.001$) after removal of 15% of the EBV and then returned to a final volume of 45.9 ± 10.3 mL/m2 after replacement of 15% of the EBV. The measurements of SVV correlated inversely with the 3D TEE LV volume measurements.
**CONCLUSIONS:** The SVV derived from the FloTrac/Vigileo system changes significantly as blood is removed and replaced during hemodilution. These changes correlate with 3D TEE measurements of LV volume. The utility of SVV in guiding optimization of intravascular volume merits further study.

## 患者体位是否影响 BIS 指数监测的读数？

**Does Patient Position Influence the Reading of the Bispectral Index Monitor?**

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背景：脑电双频指数（BIS）主要用于监测全身麻醉下患者意识水平。已发现一些因素可以影响 BIS 读数，但不影响麻醉深度。本研究目的是评价改变患者体位对 BIS 读数的影响。
方法：40 例行小手术患者，给予全身麻醉。患者保持中性位（平卧位）15min，随后转为头低位（头低 30°）、中性位及最后的头高位（头高 30°），每个体位持续 15min。记录体位时的 BIS、平均动脉压、心率、呼气末二氧化碳和呼气末异氟醚浓度。
**结果：**头低位时的 BIS 值较中性位有明显增加（中位数 47 比 40），而头高位明显低于中性位（39 比 41）（$P < 0.05$）。
**结论：**患者体位改变明显影响 BIS 值，这可能影响对麻醉深度的解释说明。（杨斌 译 马皓琳 李士通 校）

**BACKGROUND:** Bispectral index (BIS) was developed to monitor patients' level of consciousness under general anesthesia. Several factors have been found to alter BIS readings without affecting the depth of anesthesia. We conducted a study to assess the impact of changing patients' position on BIS readings.
**METHODS:** General anesthesia was administered to 40 patients undergoing minor surgeries. Patients were kept in neutral position (supine) for 15 min and BIS readings, mean arterial blood pressure, heart rate, end-tidal carbon dioxide, and end-tidal isoflurane were recorded. Patients were then shifted to head-down position (30°), neutral position, and lastly head-up position (30°) each of 15-min duration and the data were recorded.
**RESULTS:** There was a significant increase in BIS values in head-down position (median 47 vs 40) compared with neutral position, whereas head-up position significantly decreased BIS (39 vs 41) compared with neutral position ($P < 0.05$).
**CONCLUSION:** Changing a patient's position significantly affects the BIS values, which might affect the interpretation of anesthetic depth.

## GlideScope®可视喉镜下经口气管插管 Flex-ItTM 导芯不如可延展导芯有效

## The Flex-ItTM Stylet Is Less Effective than a Malleable Stylet for Orotracheal Intubation Using the GlideScope®

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**背景：** The GlideScope® 可视喉镜 (Verathon Medical, Bothell, 华盛顿州)常常可以提供较好的声门视野，但是在其指导下，通过声带行气管插管却有一项难度。这个研究的目的是通过评估气管插管时间（TTI），比较使用专门的 Flex-ItTM 导芯（FIS, Parker Medical, Highlands Ranch, 科罗拉多）和可伸展导芯。
**方法：**80 例行择期手术需要经口插管的病人，被随机分入 FIS 组和可伸展导芯组（对照组）以便于用可视喉镜气管插管。由不知道分组的评估人员记录 TTI；操作者在喉镜检查前不知道分组情况。操作者用 100mm 视觉模拟评分

法评估插管的难易程度（0 =容易到 100 = 困难）。记录尝试插管的次数、失败次数、声门暴露的程度，以及外部喉头操作。
**结果：**FIS 组中位气管插管时间为 41s （四分位距[IQR] 30-51s），对照组为 32s （IQR 28-42s）(*P* = 0.03)。气管插管难易程度视觉模拟评分，FIS 组中位数为 20（IQR11-39），对照组为 15 (IQR 8-28) (*P* = 0.13)。声门暴露程度 Cormack-Lehane 评级 I 级或 II 级的总发生率为 100%。
**结论：**由操作熟练的人员使用 GlideScope 可视喉镜经口气管插管， Flex-ItTM 导芯（FIS）不如可伸展气管导管导芯有效。
（张莹译 马皓琳 李士通校）

**BACKGROUND:** The GlideScope® videolaryngoscope (Verathon Medical, Bothell, WA) usually provides excellent glottic visualization, but directing an endotracheal tube through the vocal cords can be challenging. The goal of the study was to compare the dedicated Flex-ItTM stylet (FIS, Parker Medical, Highlands Ranch, CO) with a malleable stylet, as assessed by time to intubation (TTI).
**METHODS:** Eighty patients requiring orotracheal intubation for elective surgery were randomly allocated to either the FIS or a malleable stylet (control) to facilitate tracheal intubation using the GlideScope. TTI was recorded by blinded assessors; operators were blinded until after laryngoscopy. The operator assessed the ease of intubation using a 100-mm visual analog scale (0 = easy to 100 = difficult). The number of intubation attempts, number of failures, glottic grades, and use of external laryngeal manipulation were documented.
**RESULTS:** The median TTI was 41 s (interquartile range [IQR] 30-51) for the Flex-It group compared with 32 s (IQR 28-42) for the control group (*P* = 0.03). The median visual analog scale score for ease of intubation was 20 (IQR 11-39) for the Flex-It group compared with 15 (IQR 8-28) for the control group (*P* = 0.13). The overall incidence of a Cormack-Lehane Grade I or II glottic view was 100%.
**CONCLUSIONS:** In a group of experienced operators using the GlideScope, the FIS was less effective for orotracheal intubation than a malleable endotracheal tube stylet.

## 从脑血管压力传导中得出的与严重头部损伤重症监护患者意识恢复状态相关的新指数

**A New Index Derived from the Cerebrovascular Pressure Transmission and Correlated with Consciousness Recovery in Severely Head-Injured Intensive Care Patients**

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**背景：**在严重头部损伤的患者中，适度的（20-25mmHg）颅内压（ICP）均值难以辨别出病情稳定或改善的患者恶化的颅内情况。鉴于这样的局限性，我们查找了其他与脑血管压力传导相关的信息对颅内压曲线进行分析。我们试图在严重头部损伤患者中寻找出从脑血管压力传导的光谱分析中得出的且与意识恢复具有相关性生理学意义参数。

方法：2003 年 12 月至 2005 年 12 月期间，在法国 Montpellier 大学医院的重症监护病房进行了一项前瞻性队列研究。30 位确诊为严重头部损伤的连续患者给予镇静剂、机械通气和脑实质内压力监测，并且进行 Glasgow 预后评分。从患者发生颅脑损伤今早开始，直至死亡或临床恢复稳定，由一位对患者的数据不知情的医生每隔 15 分钟同时记录一次患者颅内压和动脉血压同步信号。颅内压的光谱和动脉压波形通过傅立叶转换进行计算机处理。分析心率和呼吸波振幅。心率（呼吸的）增益的定义指颅内压与动脉血压信号的的心脏（或呼吸）调波比，分别被标为 Gc 和 Gr。

**结果：**30 位试验者中有 20 位恢复了意识（Glasgow 预后评分为 3、4 或 5 分）。在整个记录期间取平均值的 Gr/Gc（受试者作用特征[ROC]曲线下面积 0.98，95%可信区间[CI]0.91-1）对意识恢复的辨别程度要好于颅内压(0.76; 95% CI: 0.54–0.97)、脑灌注压(0.75; 95% CI: 0.53–0.97)和 Gc(0.77; 95% CI: 0.57–0.99)（每个比较 P 都<0.001）。伤后 30 小时和 162 小时，Gr/Gc≥4 常常意味着意识恢复，其相对危险度为 9（95% CI: 1.42–57.12)。

**结论：**Gr/Gc 可描述脑血管压力传导的特征，比颅内压高值和脑灌注压的低值对严重头部损伤患者病情恶化具有更高的预示能力。Gr/Gc 比下降往往是颅内血流动力学状态恶化的一个早期预警。

（黄佳佳译，马皓琳 李士通校）

**BACKGROUND:** In patients with serious head trauma, a moderate (20–25 mm Hg) mean level of intracranial pressure (ICP) may fail to distinguish patients with a real deteriorated intracranial status from those who are stable or improving. Because of these limitations, we analyzed the ICP curve in search of other relevant information regarding cerebrovascular pressure transmission. We looked for parameters with physiological meaning extracted from spectral analysis of cerebrovascular pressure transmission and correlated with consciousness recovery in patients with severe head injuries.

**METHODS:** A prospective cohort study was conducted in an intensive care unit of the University Hospital, Montpellier, France, from December 2003 to December 2005. Thirty consecutive patients admitted for severe head trauma were subjected to sedatives, mechanical ventilation, and intraparenchymatous recording of ICP and were evaluated with Glasgow Outcome Scale score. Simultaneous 60-s recordings of ICP and arterial blood pressure (BP) signals, beginning as soon as possible after head trauma, were repeated until death or clinical stabilization, every 15 min, with physicians blinded to the patients' data. Spectra of ICP and BP waveforms were computed with Fourier transform. Amplitudes of cardiac and respiratory harmonics were analyzed. Cardiac (or respiratory) gain was defined as the ratio of amplitudes of cardiac (or respiratory) harmonic of ICP to BP signals and referred to as Gc and Gr, respectively.

**RESULTS:** Twenty of the 30 enrolled patients recovered consciousness (Glasgow Outcome Scale score = 3, 4, or 5). Gr/Gc averaged over the whole recording period performed better in discriminating consciousness recovery (area under receiver operating characteristic [ROC] curve: 0.98; 95% confidence interval [CI]: 0.91–1) than ICP (0.76; 95% CI: 0.54–0.97), cerebral perfusion pressure (0.75; 95% CI: 0.53–0.97) and Gc (0.77; 95% CI: 0.57–0.99) ($P < 0.001$ for each comparison). When considering the recording period 30 h posttrauma (hpt), 162 hpt, a value of Gr/Gc ≥4 was always associated with consciousness recovery, and the relative risk was equal to 9 (95% CI: 1.42–57.12).

**CONCLUSIONS:** Gr/Gc, which characterizes the cerebrovascular transmission, better discriminates bad evolution than high values of ICP or low values of cerebral perfusion pressure in patients with severe head trauma. A reduction in Gr/Gc ratio might be an early alarm signaling worsening intracranial hemodynamic conditions.

## 重组活化 VII 因子在产科出血中的使用：来自于澳大利亚和新西兰止血登记处的经验

**Recombinant Activated Factor VII in Obstetric Hemorrhage: Experiences from the Australian and New Zealand Haemostasis Registry**

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**目的：**通过澳大利亚和新西兰止血登记处，我们报道关于澳大利亚和新西兰在产科病人中使用重组活化 VII 因子（rFVIIa）的经验。
**方法：**rFVIIa 在标签外适应症包括创伤、心脏手术以及严重的产后出血中的作用仍有争议。由莫纳斯（Monash）大学（澳大利亚墨尔本）建立的止血登记处监测 rFVIIa 在澳大利亚和新西兰的标签外使用情况。本研究的目的在于汇总参与的医院在 2002 年 1 月至 2008 年 7 月之间使用 rFVIIa 治疗的所有产科出血病人的登记资料。主要的结果指标是出血减少或停止（阳性治疗反应）、死亡率以及子宫切除率。
**结果：**在研究期间，登记处收到 2128 个病例的资料。这包括来自 38 个医院的 110 例在产科病人中使用 rFVIIa 的病例，占总登记处例数的 5%，其中 105 例因急性出血而接受治疗。病人接受 rFVIIa 的个别剂量中位数（四分位间距）为 92 μg/kg (73–100)（中位数总剂量 92 μg/kg [58-108]），78%的病例接受了单次剂量。对 rFVIIa 的阳性反应率为 76%，其中 64%是对首次剂量有反应。28 天时有 91%的患者存活。43 例（41%）在接受 rFVIIa 之前实施了子宫切除术，在剩下的患者中有 13 例（21%）在 rFVIIa 治疗后仍需要行子宫切除术。有两例血栓栓塞事件（1 例肺栓塞，1 例深静脉血栓形成）和 1 例由严重缺氧导致的低氧－缺血性脑病见诸于报道。
**结论：**报道中 rFVIIa 在许多，但不是全部产科病例中有效。没有因血栓栓塞并发症导致的死亡。需要有随机、对照试验来确认其安全性和有效性，并评估早期使用治疗严重产后出血，避免需求助于产后子宫切除来控制出血，从而保全生育能力的可能性。
（黄施伟 译，马皓琳 李士通 校）

**OBJECTIVE:** Through the Australian and New Zealand Haemostasis Registry, we report on the Australian and New Zealand experience with recombinant activated factor VII (rFVIIa) in obstetric patients.
**METHODS:** The role of rFVIIa for off-label indications, including trauma, cardiac surgery, and severe postpartum hemorrhage, remains controversial. The Haemostasis Registry established by Monash University in Melbourne, Australia monitors off-label use of rFVIIa across Australia and New Zealand. The purpose of this study was to summarize Registry data for all obstetric hemorrhage patients treated with rFVIIa at participating hospitals between January 2002 and July 2008. The primary outcome measures were reduction or cessation of bleeding (positive therapeutic response), mortality, and hysterectomy rate.
**RESULTS:** During the study period, the Registry received data for 2128 patients. This included 110 cases of administration of rFVIIa in obstetric patients from 38 hospitals, comprising 5% of the total Registry population, 105 of whom were treated for acute hemorrhage. Women received median (interquartile range) individual doses of 92 μg/kg (73–100) of rFVIIa (median total dose 92 μg/kg [58–108]), and 78% of patients received a single dose. The positive response rate to rFVIIa was 76% with 64% responding to the first dose. Ninety-one percent of women were alive at 28 days. Forty-three women (41%) underwent hysterectomy before receiving rFVIIa and, of those remaining, 13 (21%) required hysterectomy after rFVIIa therapy. Two thromboembolic events (1 pulmonary embolism and 1 deep venous thrombosis) and 1 case of hypoxic-ischemic encephalopathy resulting from severe anoxia were reported.
**CONCLUSIONS:** The reported effect of rFVIIa in many, but not all, obstetric cases was positive. There was no mortality as a result of thromboembolic complications. Randomized, controlled trials are required to confirm its safety and efficacy and to assess the possibility that use at an earlier stage in treatment of severe postpartum hemorrhage may avoid the need to resort to postpartum hysterectomy for control of bleeding, thus preserving fertility.

## 在产科麻醉中全身性的应用瑞芬太尼

**Systemic Remifentanil for Labor Analgesia**

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目前我们需要一种安全、有效、方便给药的全身性镇痛方法从而达到快速起效和终止，配合好子宫收缩的时程，并且不危害胎儿。虽然椎管内阻滞是产科镇痛的“金标准”，但是全身镇痛可以应用于那些椎管内镇痛禁忌、产妇拒绝或仅仅不需要、或操作熟练的麻醉医生不在场的病例。由于瑞芬太尼独特的药理学特性，经过研究且已应用于临床以提供静脉内产科镇痛。在围绕着这个焦点的综述中，我们概述了瑞芬太尼作为产科止痛剂的有效性，并回顾了关于其用量、分娩方式、母婴安全性的最近文献和将来研究的展望。（姜旭晖译，马皓琳，李士通校）
There is a need for safe, effective, and easy-to-administer systemic analgesia that ideally has rapid onset and offset, matches the time course of uterine contractions, and does not compromise the fetus. Although neuraxial blockade is the "gold

standard" for labor analgesia, systemic analgesia is useful in those cases in which neuraxial analgesia is contraindicated, refused or simply not needed by the parturient, or when skilled anesthesia providers are not available. Because of its unique pharmacologic properties, remifentanil has been investigated, and is used clinically, to provide IV labor analgesia. In this focused review, we summarize the efficacy of remifentanil as a labor analgesic and review the current literature regarding its dose, mode of delivery, safety for the mother and fetus/neonate, as well as the scope for future research.

## 尼莫地平预防成年小鼠由硝酸甘油引发的低血压所导致的记忆受损

**Nimodipine Prevents Memory Impairment Caused by Nitroglycerin-Induced Hypotension in Adult Mice**

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**背景**：低血压及其所导致的脑血流下降与认知功能障碍的进展有关。我们验证了在硝酸甘油(NTG)导致的低血压起效时使用尼莫地平(NIMO)将有助于保护长期的联想记忆。
**方法**：使用被动逃避(PA)模式来评估记忆力。在 PA 训练，记录大鼠从悬吊平台进入装有自动电击装置的树脂玻璃管内的潜伏期时间（秒）。48 小时后记录潜伏期时间用于复核试验。将 96 只 Swiss-Webster 小鼠(30–35 克, 6–8 周)，随机分成 6 组：1）生理盐水（对照组）、2）学习后即刻使用 NTG 组、3）学习后 3 小时使用 NTG 组、4）NTG 及 NIMO 组、5）溶剂组和 6）单独使用 NIMO 组。研究各组内动物低血压的程度及脑组织氧合（PbtO2）和脑血流的变化。
**结果**：各组的训练潜伏期时间相似(17.0 ± 4.6 s)。与生理盐水组、NTG + NIMO 组、延迟使用 NTG 组(分别为 580 ± 81 s、557 ± 67 s 及 493 ± 146 s)相比，小鼠在遭受低血压后表现出潜伏期时间明显下降(178 ± 156 s)。使用 Kruskal-Wallis 单因素方差分析显示 4 种处理方法组间有显著性差异($H$ = 15.34; $P$ < 0.001)。在没有进行行为学研究的一个单组小鼠中，相同剂量的 NTG ($n$ = 3) 及 NTG + NIMO ($n$ = 3)使平均动脉压分别从 85.9 ± 3.8 mm Hg sem 下降至 31.6 ± 0.8 mm Hg sem 及从 86.2 ± 3.7 mm Hg sem 下降至 32.6 ± 0.2 mm Hg sem。单独使用 NIMO 组小鼠的平均动脉压从 88.1 ± 3.8 mm Hg 下降至 80.0 ± 2.9 mm Hg。组间差异有统计学意义($P$ < 0.05)。NTG 组的 PbtO2 从 51.7 ± 4.5 mm Hg sem 下降至 33.8 ± 5.2 mm Hg sem，NTG + NIMO 组的 PbtO2 从 38.6 ± 6.1 mm Hg sem 下降至 25.4 ± 2.0 mm Hg sem，组间无显著性差异。
**结论**：在 PA 记忆模式中，小鼠学习后即刻注射 NTG 能使长期联想记忆明显受损，而延期注射后导致的低血压无此作用。NIMO 能减轻由 NTG 引起的长期记忆巩固的受损，但不能改善无低血压时的潜伏期时间。因为组间的 PbtO2 指数无差异，所观察到的 NIMO 的作用可能归因于低血压期间钙稳态的保持。
（裘毅敏译，马皓琳、李士通校）

**BACKGROUND:** Hypotension and a resultant decrease in cerebral blood flow have been implicated in the development of cognitive dysfunction. We tested the hypothesis that nimodipine (NIMO) administered at the onset of nitroglycerin (NTG)-induced hypotension would preserve long-term associative memory.
**METHODS:** The passive avoidance (PA) paradigm was used to assess memory retention. For PA training, latencies (seconds) were recorded for entry from a suspended platform into a Plexiglas tube where a shock was automatically delivered. Latencies were recorded 48 h later for a testing trial. Ninety-six Swiss-Webster mice (30–35 g, 6–8 wk), were randomized into 6 groups 1) saline (control), 2) NTG immediately after learning, 3) NTG 3 h after learning, 4) NTG and NIMO, 5) vehicle, and 6) NIMO alone. The extent of hypotension and changes in brain tissue oxygenation (PbtO2) and in cerebral blood flow were studied in a separate group of animals.
**RESULTS:** All groups exhibited similar training latencies (17.0 ± 4.6 s). Mice subjected to hypotensive episodes showed a significant decrease in latency time (178 ± 156 s) compared with those injected with saline, NTG + NIMO, or delayed NTG (580 ± 81 s, 557 ± 67 s, and 493 ± 146 s, respectively). A Kruskal-Wallis 1-way analysis of variance indicated a significant difference among the 4 treatment groups ($H = 15.34$; $P < 0.001$). In a separate group of mice not subjected to behavioral studies, the same dose of NTG ($n = 3$) and NTG + NIMO ($n = 3$) caused mean arterial blood pressure to decrease from 85.9 ± 3.8 mm Hg sem to 31.6 ± 0.8 mm Hg sem and from 86.2 ± 3.7 mm Hg sem to 32.6 ± 0.2 mm Hg sem, respectively. Mean arterial blood pressure in mice treated with NIMO alone decreased from 88.1 ± 3.8 mm Hg to 80.0 ± 2.9 mm Hg. The intergroup difference was statistically significant ($P < 0.05$). PbtO2 decreased from 51.7 ± 4.5 mm Hg sem to 33.8 ± 5.2 mm Hg sem in the NTG group and from 38.6 ± 6.1 mm Hg sem to 25.4 ± 2.0 mm Hg sem in the NTG + NIMO groups, respectively. There were no significant differences among groups.
**CONCLUSION:** In a PA retention paradigm, the injection of NTG immediately after learning produced a significant impairment of long-term associative memory in mice, whereas delayed induced hypotension had no effect. NIMO attenuated the disruption in consolidation of long-term memory caused by NTG but did not improve latency in the absence of hypotension. The observed effect of NIMO may have been attributable to the preservation of calcium homeostasis during hypotension, because there were no differences in the PbtO2 indices among groups.

## 单剂量丙泊酚注射对慢性日常头痛中疼痛和生活质量的影响：一个随机、双盲、对照实验

**The Effect of Single-Dose Propofol Injection on Pain and Quality of Life in Chronic Daily Headache: A Randomized, Double-Blind, Controlled Trial**

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**背景**：基于少量个案研究，静脉注射丙泊酚被提倡用于治疗慢性日常头痛(CDH)。这个治疗尚没有随机对照试验。我们进行这个随机、双盲、安慰剂

对照实验的目的是检测单次静脉注射丙泊酚 2.4 mg/kg 是否在随后 30 天导致 CDH 中的残疾或疼痛在临床上显著性减少。
**方法**：患 CDH 的合适成年人接受积极治疗（静脉输注丙泊酚）(n = 20)或有药安慰剂治疗（静脉注射咪达唑仑）（n = 20）。主要的检测结果包括：(a)治疗后 30 天时的头痛致残清单（HDI）、(b)头痛指数（ 30 天期间头痛强度的一个总结性值）及(c)使用给药定量评分版本 III 检测的镇痛药消耗。
**结果**：丙泊酚注射后 30 天时的 HDI 评分减少了 9.47 分（标准差 14.1）(*P* = 0.009)，但是头痛有关的残疾减少的幅度小于 HDI 开发者认为的有临床意义的减少幅度。对照组 HDI 没有统计学意义的变化。两组通过头痛指数测得的平均疼痛强度和通过给药定量评分版本 III 测得的药物使用的减少在组内和组间都没有统计学意义。
**结论**：单次静脉输注丙泊酚 2.4 mg/kg 后 30 天对 CDH 致残产生显著地减少，但没有临床意义，且没有减少疼痛强度和镇痛剂的使用。这项研究不支持静脉注射丙泊酚用于临床处理 CDH 的计划。
（王宏翻译，马皓琳，李士通校正）

**BACKGROUND:** On the basis of a small number of case studies, IV propofol has been advocated for the treatment of chronic daily headache (CDH). There has been no randomized controlled trial of this therapy. Our objective in this randomized, double-blind, placebo-controlled trial was to determine whether a single IV dose of propofol 2.4 mg/kg results in clinically significant reduction in disability or pain in CDH for the next 30 days.
**METHODS:** Eligible adults with CDH received either active treatment with IV propofol infusion (*n* = 20) or active placebo of IV midazolam (*n* = 20). The main outcome measures were (a) Headache Disability Inventory (HDI) at 30 days posttreatment, (b) Headache Index, a summary measure of headache intensity over the 30-day period, and (c) analgesic consumption measured as the Medication Quantification Scale version III.
**RESULTS:** Propofol reduced the HDI by 9.47 points (sd 14.1) at 30 days after injection (*P* = 0.009), but this is a smaller reduction in headache-related disability than that which the developers of the HDI regard as clinically significant. There was no statistically significant change in HDI for the control group. There were no significant within- or between-group reductions in mean pain intensity as measured by the Headache Index or medication use as measured by the Medication Quantification Scale version III in either group.
**CONCLUSIONS:** A single IV infusion of propofol 2.4 mg/kg produces a statistically significant, but not clinically meaningful, reduction in disability from CDH 30 days after infusion and does not reduce pain intensity or analgesic use. This study does not support this regimen of IV propofol for clinical management of CDH.

## 酮洛芬产生模式特异性抑制大鼠足底切开后的疼痛行为

## Ketoprofen Produces Modality-Specific Inhibition of Pain Behaviors in Rats After Plantar Incision

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**背景**：尽管用目前的药物能得到最佳治疗，术后疼痛仍然是一个重大的问题。非甾体抗炎药减轻炎症，并提供镇痛，但引起不良副作用。
**方法**：我们测试了大鼠足底切开后用低剂量（0.5-5mg/kg）酮替芬肠外应用以对抗疼痛相关的行为。为了进一步评估酮洛芬在我们的模型中的作用部位，一种新的缓释微粒的酮洛芬放入伤口部位，并测试其对痛行为的影响。同时对鞘内应用 150μg 酮替芬进行了研究。用血浆样品测定药物浓度。
**结果**：我们发现，肠外应用低剂量酮替芬对疼痛行为产生了模式特异性的影响；切开后的防御能力下降，而没有明显抑制对加热或机械刺激的过度反应。极低剂量酮替芬（0.5 mg/kg）可产生对防御的抑制。局部应用缓释酮替芬洗脱微粒和鞘内注射酮替芬对切皮后的疼痛行为，也产生一种模式特异性的影响，仅仅抑制防御能力。酮洛芬肠胃外或局部应用后的血浆水平，对术后病人而言，在治疗性血药浓度水平范围之内。
**结论**：本研究表明，酮替芬对足底切开后的大鼠是一种不激发防御的有效镇痛药。对机械或热反应无影响，这突出了多模式测试痛行为对于药物评价的重要性。我们发现了术后病人中临床使用的剂量的有效性。
（黄丽娜 译 马皓琳 李士通 校）
**BACKGROUND:** Postoperative pain remains a significant problem despite optimal treatment with current drugs. Nonsteroidal antiinflammatory drugs reduce inflammation and provide analgesia but are associated with adverse side effects.
**METHODS:** We tested low doses (0.5–5 mg/kg) of parenteral ketoprofen against pain-related behaviors after plantar incision in rats. To further evaluate the potential sites of action of ketoprofen in our model, a novel, sustained-release microparticle formulation of ketoprofen was placed into the wound, and tested for its effects on pain behaviors. Intrathecal ketoprofen (150 μg) was also studied. Plasma samples were assayed for drug concentrations.
**RESULTS:** We found that low doses of parenterally administered ketoprofen produced a modality-specific effect on pain behaviors; guarding after incision was decreased, whereas no inhibition of exaggerated responses to heat or mechanical stimuli was evident. Very low doses, 0.5 mg/kg, could produce inhibition of guarding. The locally applied sustained-release ketoprofen-eluting microparticles and intrathecally administered ketoprofen also produced a modality-specific effect on pain behaviors after incision, inhibiting only guarding. Plasma levels of ketoprofen after parenteral or local administration were in the range of therapeutic blood levels in postoperative patients.
**CONCLUSIONS:** This study demonstrates that ketoprofen is an effective analgesic for nonevoked guarding in rats after plantar incision. There was no effect on mechanical or heat responses, which highlights the importance of multiple-modality testing of pain behaviors for drug evaluation. We found efficacy at doses used clinically in postoperative patients.

## 硬膜外间隙的识别：比较空气与液体作为阻力消失的介质后并发症的荟萃分析

**Epidural Space Identification: A Meta-Analysis of Complications After Air Versus Liquid as the Medium for Loss of Resistance**

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**背景**：鉴定硬膜外间隙来完成椎管内麻醉的最好方法是有争议的。我们进行这个荟萃分析来证明一个假设，即用液体的阻力消失法能减少硬膜外置管的并发症。
**方法**：在 MEDLINE、EMBASE 和 Cochrane 数据库中，检索在成人硬膜外间隙鉴定中比较空气和液体作为阻力消失的介质的前瞻性随机研究。从达到选择标准的 5 个研究（4 个产科和 1 个非产科）（n＝4422 例患者）中提取数据，并分析以下 6 个结果：置管困难、感觉异常、置管入血管、意外刺破硬膜、硬膜刺破后头痛和部分阻滞。
**结果**：在产科人群中并发症的总风险方面，两种介质之间没有统计学差异。在用于治疗慢性疼痛的硬膜外穿刺过程中用液体时，硬膜刺破后头痛的风险有一个小的、但有统计学意义的差异。
**结论**：我们需要更大的研究，可克服跨研究的异质性和并发症发生率相对较低的局限性，来确定硬膜外阻滞中用于阻力消失法的最佳介质。
（唐亮 译 马皓琳 李士通 校）
**BACKGROUND:** The best method for identifying the epidural space for neuraxial blocks is controversial. We conducted this meta-analysis to test the hypothesis that loss of resistance with liquid reduces complications with epidural placement.
**METHODS:** The MEDLINE, EMBASE, and Cochrane databases were searched for prospective, randomized studies comparing air versus liquid as the medium for loss of resistance during epidural space identification in adults. Data were abstracted from 5 studies (4 obstetric and 1 nonobstetric) ($n$ = 4422 patients) that met inclusion criteria and analyzed for the following 6 outcomes: difficult catheter insertion, paresthesia, intravascular catheter insertion, accidental dural puncture, postdural puncture headache, and partial block.
**RESULTS:** The overall risk differences for adverse outcome between the different mediums were not statistically different for the obstetric population. A small, but statistically significant, risk difference for postdural puncture headache was observed when fluid was used during epidural placement for chronic pain management.
**CONCLUSION:** Larger studies that overcome limitations of heterogeneity across studies and a relatively infrequent occurrence of complications are required to determine the optimal medium for loss of resistance during epidural block.

## 体外循环手术应首选大剂量的淀粉代血浆平衡液还是以白蛋白为基础的补液方案

**Cardiopulmonary Bypass Priming Using a High Dose of a Balanced Hydroxyethyl Starch Versus an Albumin-Based Priming Strategy**

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**背景**：体外循环（CPB）手术应首选哪种补液尚未有定论。在这项研究就中，我们将比较大剂量的淀粉代血浆平衡液（HES）与以白蛋白为基础的 CPB 补液方案对于凝血功能、炎症反应以及器官功能方面的影响，并做出评估。
**方法**：50 位择期行冠状动脉旁路分流手术的患者将在术中随机接受以下一种的 CPB 环路补液方案，一个是 1500mL 含 6% HES 130/0.42 的电解质平衡液（钠 140mmol/L，氯 118mmol/L，钾 4mmol/L，钙 2.5mmol/L，镁 1mmol/L，醋酸盐 24mmol/L，苹果酸盐 5mmol/L）（样本量=25），一个是 500mL 5%人体白蛋白与 1000mL 0.9%生理盐水的混合液（样本量=25）。分别在麻醉诱导后，手术结束即刻，术后 5 小时以及术后第一天和第二天早晨检测受试者的炎症反应（白介素[IL]-6，-10），内皮细胞损伤（可溶性细胞内黏附分子-1），肾功能（肾特异性蛋白 α-谷胱甘肽-硫-转移酶，中性粒细胞明胶酶相关脂类），凝血功能（用凝血酶检测仪检测[型号 ROTEM（R），Pentapharm，Munich，Germany]）以及血小板功能（用全血集合度计进行检测[型号 Multiplate(R) analyzer, Dynabyte Medical, Munich, Germany]）。
**结果**：CPB 术中及术后总的补液量为 3090 +/- 540 mL HES 平衡液和 3110 +/- 450 mL 白蛋白。白蛋白组与 HES 平衡液组相比较少出现术后碱剩余（-5.9 +/- 1.2 mmol/L vs +0.2 +/- 0.2 mmol/L，P=0.0003）。CPB 后各个检测时点白蛋白组的血浆 IL-6、IL-10 水平，细胞内黏附分子-1 水平均高于 HES 平衡液组（P=0.0002）。CPB 完成至研究结束的整个过程中，白蛋白组 α-谷胱甘肽-硫-转移酶和中性粒细胞明胶酶相关脂类的尿液浓度均高于 HES 平衡液组（P=0.00004）。从手术结束到术后第一天所采集的的凝血数据（凝血时间及血凝形成时间）显示白蛋白组相较于 HES 组凝血功能受损更多（P=0.004）。相较于基线值，大剂量 HES 平衡液组的血小板功能在 CPB 术后即刻和术后 5 小时没有改变，而白蛋白组的血小板功能却有明显下降。
**结论**：与以白蛋白为基础的 CPB 补液方案相比，大剂量的 HES 平衡液可以减少炎症反应，减少内皮损伤，对肾小球合成功能的影响较小。同时，大剂量 HES 平衡液在 CPB 术后包括血小板功能在内的凝血功能保护方面也优于以白蛋白为基础的 CPB 补液方案。
（单嘉琪译 薛张纲校）
**BACKGROUND**: The optimal priming solution for cardiopulmonary bypass (CPB) is unclear. In this study, we evaluated the influence of high-volume priming with a modern balanced hydroxyethyl starch (HES) preparation on coagulation, inflammation, and organ function compared with an albumin-based CPB priming regimen.
**METHODS**: In 50 patients undergoing coronary artery bypass grafting, the CPB circuit was prospectively and randomly primed with either 1500 mL of 6% HES 130/0.42 in a balanced electrolyte solution (Na+ 140 mmol/L, Cl- 118 mmol/L, K+ 4 mmol/L, Ca2+ 2.5 mmol/L, Mg++ 1 mmol/L, acetate- 24 mmol/L, malate- 5 mmol/L) (n = 25) or with 500 mL of 5% human albumin plus 1000 mL 0.9% saline solution (n = 25). Inflammation (interleukins [IL]-6, -10), endothelial damage (soluble

intercellular adhesion molecule-1), kidney function (kidney-specific proteins [alpha]-glutathione S-transferase, neutrophil gelatinase-associated lipocalin), coagulation (measured by thrombelastometry [ROTEM(R), Pentapharm, Munich, Germany]), and platelet function (measured by whole blood aggregometry [Multiplate(R) analyzer, Dynabyte Medical, Munich, Germany]) were assessed after induction of anesthesia, immediately after surgery, 5 h after surgery, and on the morning of first and second postoperative days.
**RESULTS**: Total volume given during and after CPB was 3090 +/- 540 mL of balanced HES and 3110 +/- 450 mL of albumin. Base excess after surgery was lower in the albumin-based priming group than in the balanced HES priming group (-5.9 +/- 1.2 mmol/L vs +0.2 +/- 0.2 mmol/L, P = 0.0003). Plasma levels of IL-6, IL-10, and intercellular adhesion molecule-1 were higher after CPB in the albumin-based priming group compared with the HES priming group at all time periods (P = 0.0002). Urinary concentrations of [alpha]-glutathione S-transferase and neutrophil gelatinase-associated lipocalin were higher after CPB through the end of the study in the albumin group compared with the balanced HES group (P = 0.00004). After surgery through the first postoperative day, thrombelastometry data (clotting time and clot formation time) revealed more impaired coagulation in the albumin-based priming group compared with the HES priming group (P = 0.004). Compared with baseline, platelet function was unchanged in the high-dose balanced HES priming group after CPB and 5 h after surgery, but it was significantly reduced in the albumin-based priming group.
**CONCLUSION**: High-volume priming of the CPB circuit with a modern balanced HES solution resulted in reduced inflammation, less endothelial damage, and fewer alterations in renal tubular integrity compared with an albumin-based priming. Coagulation including platelet function was better preserved with high-dose balanced HES CPB priming compared with albumin-based CPB priming.

## 通过新手行超声引导下小儿髂腹股沟与髂腹下神经阻滞判定超声定位的可靠性

**Defining the reliability of sonoanatomy identification by novices in ultrasound-guided pediatric ilioinguinal and iliohypogastric nerve blockade.**

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**背景**：髂腹股沟（II）与髂腹下（IH）神经阻滞是一项可靠并广泛运用的阻滞方式，使用超声引导可提高其实施的安全性和可靠性。此次研究旨在评估临床经验有限的儿科麻醉医师在行超声引导区域麻醉时正确识别腹股沟区解剖结构的次数。初期结果为比较腹横肌（TA）与 II 或 IH 神经正确定位的次数。采用两种不同类型的超声设备评估医疗仪器对于成功定位组织结构及定位所需时间的潜在影响。
**方法**：7 名临床经验不足 6 月的儿科麻醉医师行超声引导区域麻醉，总共获得 127 幅麻醉患儿的髂腹股沟区扫描图像。分别识别并标记肌平面与 II 和 IH 神

经。根据不知情的超声学专家对超声影像的评价，判定组织结构定位的准确性及定位所需时间。研究中共需用到两种类型超声仪（索诺声 C180plus 与 Micromaxx，索诺声公司，波泰尔，华盛顿州）。

**结果**：正确识别 TA 肌的次数与正确定位 II 或 IH 神经的次数间并无统计学差异（卡方检验，TA 与 II，P=0.45；TA 与 IH，P=0.50）。比较两种类型的超声仪器后显示，就提高 II 或 IH 神经定位的准确性而言，其显著性趋势并不明显（II 神经卡方检验，P=0.02；IH 神经卡方检验，P=0.04；Bonferroni 校正水平 0.17），而在识别肌平面（卡方检验，P=0.83）和定位所需时间（单向方差分析法，P=0.07）方面，两者间无统计学差异。根据结构定位的准确性及扫描图像的数量绘制坐标曲线，发现在完成 14-15 次超声扫描后可成功识别 TA，而正确定位 II 或 IH 则需完成 18 次扫描。

**结论**：研究证实，虽然识别肌平面的准确度与识别 II 或 IH 神经的总体准确度间无显著性差异，但肌平面只需在较少实施腹股沟区超声扫描后便可可靠定位。建议缺乏临床经验的执业医师在行超声引导 II 或 IH 神经阻滞时，可将腹横肌或腹内斜肌的肌平面作为扫描的可靠终点，据报道 100%的病例均可在此发现 II 和 IH 神经。

（范羽译 薛张纲校）

**BACKGROUND**: The ilioinguinal (II)/iliohypogastric (IH) nerve block is a safe, frequently used block that has been improved in efficacy and safety by the use of ultrasound guidance. We assessed the frequency with which pediatric anesthesiologists with limited experience with ultrasound-guided regional anesthesia could correctly identify anatomical structures within the inguinal region. Our primary outcome was to compare the frequency of correct identification of the transversus abdominis (TA) muscle with the frequency of correct identification of the II/IH nerves. We used 2 ultrasound machines with different capabilities to assess a potential equipment effect on success of structure identification and time taken for structure identification.

**METHODS**: Seven pediatric anesthesiologists with <6 mo experience with ultrasound-guided regional anesthesia performed a total of 127 scans of the II region in anesthetized children. The muscle planes and the II and IH nerves were identified and labeled. The ultrasound images were reviewed by a blinded expert to mark accuracy of structure identification and time taken for identification. Two ultrasound machines (Sonosite C180plus and Micromaxx, both from Sonosite, Bothell, WA) were used.

**RESULTS**: There was no difference in the frequency of correct identification of the TA muscle compared with the II/IH nerves (chi(2) test, TA versus II, P = 0.45; TA versus IH, P = 0.50). Ultrasound machine selection did show a nonsignificant trend in improving correct II/IH nerve identification (II nerve chi(2) test, P = 0.02; IH nerve chi(2) test, P = 0.04; Bonferroni corrected significance 0.17) but not for the muscle planes (chi(2) test, P = 0.83) or time taken (1-way analysis of variance, P = 0.07). A curve of improving accuracy with number of scans was plotted, with reliability of TA recognition occurring after 14-15 scans and II/IH identification after 18 scans.

**CONCLUSIONS**: We have demonstrated that although there is no difference in the overall accuracy of muscle plane versus II/IH nerve identification, the muscle planes are reliably identified after fewer scans of the inguinal region. We suggest that a reliable end point for the inexperienced practitioner of ultrasound-guided II/IH nerve block may be the TA/internal oblique plane where the nerves are reported to be found in 100% of cases.

# 右美托咪定与异丙酚镇静下脑电双频指数与表观镇静程度之间的关系

**The correlation between bispectral index and observational sedation scale in volunteers sedated with dexmedetomidine and propofol.**

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**背景**：脑电双频指数(BIS)是广泛应用的评价麻醉镇静深度的指标。右美托咪定是一种新的镇静药物，它在镇静的同时还可以保持一定的合作性并且可以很容易唤醒。BIS用于评价右美托咪定的镇静深度作用并不理想。因此，我们试图验证在警觉性与镇静深度的观察者评分(OAA/S)具有可比性的条件下右美托咪定镇静时的BIS值低于异丙酚的BIS值。

**方法**：本次研究为期2天，随机，采用自身配对的研究方法。第一天，健康志愿者们随机分为进入异丙酚与右美托咪定组。分别通过电脑自动控制靶控输注维持异丙酚效应室浓度在1,2和4ug/ml;右美托咪定的血浆浓度在0.6,1.2和2.4ng/ml。在达到目标浓度的20分钟和40分钟，记录BIS值和OAA/S评分。分别比较两组在各个OAA/S评分下的BIS值。通过分析受试者特征曲线得到对于BIS值OAA/S评分的截断值为小于等于2。

**结果**：总计9名志愿者。右美托咪定镇静下心率明显下降。呼末二氧化碳随异丙酚剂量增加而下降，右美托咪定无此作用。异丙酚镇静下在OAA/S为1,2,3,4和5分时BIS值分别为95.5 (90-97), 78 (71-84.5), 67 (64-70), 57 (51.5-60), 和34 (30-37)。右美托咪定镇静下在OAA/S为1,2,3,4和5分时BIS值分别为95 (79-98), 62 (53.5-68.5), 45.5 (45.3-52), 39.5 (34.3-41.8), 和24.5 (22.5-30.5)。在OAA/S为2,3和4分时，右美托咪定组的BIS值均显著低于异丙酚组。在OAA/S评分小于等于2时异丙酚组的BIS截断值为67(敏感性86%,特异性97%,曲线下面积0.98)，而右美托咪定组的BIS截断值为46(敏感性84%,特异性91%,曲线下面积0.96)。

**结论**：临床工作中评价镇静深度时，同时使用BIS值和镇静深度评分会得到不同且互补的结果。尤其是当应用右美托咪定时，更显出相对于单一方法的优越性。

（黄剑译 薛张纲校）

**BACKGROUND**: Bispectral index (BIS) is a widely used quantitative parameter for evaluating anesthesia and sedation levels. Dexmedetomidine is a novel sedative, providing sedation while patients remain cooperative and can be easily aroused; as a consequence, BIS used with dexmedetomidine may poorly characterize sedation. Thus, we tested the hypothesis that BIS values are lower with dexmedetomidine than with propofol at comparable Observer's Assessment of Alertness and Sedation (OAA/S) scores.

**METHODS**: This was a randomized, 2-day, crossover study. On the first study day, healthy volunteers were randomly allocated to either propofol or dexmedetomidine sedation. Drugs were administered using computer-controlled infusions targeting an

effect-site concentration of 1, 2, and 4 microg/mL for propofol or a plasma concentration of 0.6, 1.2, and 2.4 ng/mL for dexmedetomidine. The relationship between BIS and OAA/S score was obtained 20 and 40 min after changing each drug concentration. BIS values at each OAA/S score were compared between drugs. The cutoff values of BIS for OAA/S score of < or =2 were obtained by analysis of receiver operating characteristic curves.
**RESULTS**: Nine volunteers were included in our analysis. Heart rates decreased significantly with dexmedetomidine sedation. ETco(2) was significantly increased with high doses of propofol but did not increase with high doses of dexmedetomidine. BIS values at OAA/S scores of 1, 2, 3, 4, and 5 during propofol sedation were 95.5 (90-97), 78 (71-84.5), 67 (64-70), 57 (51.5-60), and 34 (30-37), respectively. BIS values at OAA/S scores of 1, 2, 3, 4, and 5 during dexmedetomidine sedation were 95 (79-98), 62 (53.5-68.5), 45.5 (45.3-52), 39.5 (34.3-41.8), and 24.5 (22.5-30.5), respectively. BIS values were significantly less with dexmedetomidine than propofol at OAA/S responsiveness scores of 2, 3, and 4. The calculated cutoff BIS values for OAA/S scores of < or =2 were 67 (sensitivity of 86%, specificity of 97%, and area under the curve of 0.98) for propofol and 46 (sensitivity of 84%, specificity of 91%, and area under the curve of 0.96) for dexmedetomidine.
**CONCLUSION**: The combination of both BIS and sedative scales could provide different and complementary data to the clinician evaluating the patient's response to sedation than would either tool alone, especially when dexmedetomidine is used.

## 猪模型中应用微孔膜进质谱分析肺分流量与赖利分流的比较

**A Comparison of Micropore Membrane Inlet Mass Spectrometry–Derived Pulmonary Shunt Measurement with Riley Shunt in a Porcine Model**

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**背景**： 多个惰性气体排除技术被开发用于测量肺内各部分的通气血流比(V(A)'/Q')。在兔子肺模型中，应用微孔膜进质谱(MMIMS)取代了气相色谱用于惰性气体的测量。然而，对动脉氧量的测定还没有一种被公认的并可常用的方法。我们用猪肺损伤模型将 MMIMS 分流作为心总输出量（CO）的一小部分与根据赖利分流规则得到的莱利分流进行比较。
**方法**：要允许广泛的肺不张并有分流的变异，对 8 个对照动物不进行肺灌洗，而另 8 个动物以 30 mL/kg 温的乳酸林格液按以下方法进行肺灌洗：2 个动物肺灌洗 1 次，5 个动物灌洗 2 次，1 个动物灌洗 3 次。在基础线和两次肺损害以后纪录变量(T1 和 T2)。用 MMIMS 分析磺化六氟化合物、氪、地氟醚、安氟醚、

二乙醚和丙酮的数据，并且应用已知的多个惰性气体分析技术得到了 MMIMS 分流数据。应用标准公式演算得到 R-S。
**结果**：记录了 44 对 M-S 和 R-S。 M-S 变化范围从 0.1%到 35.4%，R-S 的变化范围从 3.7%到 62.1%。M-S 显示出与 R-S 呈线性相关： M-S = -4.26 + 0.59 x R-S (r (2) = 0.83)。M-S 平均低于 R-S (平均数= -15.0% CO、sd = 6.5% CO 和中位数= -15.1)，上下限分别为-2.0%和-28.0%。95%可信区间的下限和上限是-17.0 和-13.1 (P < 0.001，t 检验)。
**结论**：在呼吸过程中惰性气体微孔膜进质谱获得的分流数据与 R-S 良好相关。MMIMS 分流通常比 R-S 少。
（李莹译 薛张纲校）

**BACKGROUND**: The multiple inert gas elimination technique was developed to measure shunt and the ratio of alveolar ventilation to simultaneous alveolar capillary blood flow in any part of the lung (V(A)'/Q') distributions. Micropore membrane inlet mass spectrometry (MMIMS), instead of gas chromatography, has been introduced for inert gas measurement and shunt determination in a rabbit lung model. However, agreement with a frequently used and accepted method for quantifying deficits in arterial oxygenation has not been established. We compared MMIMS-derived shunt (M-S) as a fraction of total cardiac output (CO) with Riley shunt (R-S) derived from the R-S formula in a porcine lung injury model.
**METHODS**: To allow a broad variance of atelectasis and therefore shunt fraction, 8 sham animals did not receive lavage, and 8 animals were treated by lung lavages with 30 mL/kg warmed lactated Ringer's solution as follows: 2 animals were lavaged once, 5 animals twice, and 1 animal 3 times. Variables were recorded at baseline and twice after induction of lung injury (T1 and T2). Retention data of sulfur hexafluoride, krypton, desflurane, enflurane, diethyl ether, and acetone were analyzed by MMIMS, and M-S was derived using a known algorithm for the multiple inert gas elimination technique. Standard formulas were used for the calculation of R-S.
**RESULTS**: Forty-four pairs of M-S and R-S were recorded. M-S ranged from 0.1% to 35.4% and R-S from 3.7% to 62.1%. M-S showed a correlation with R-S described by linear regression: M-S = -4.26 + 0.59 x R-S (r(2) = 0.83). M-S was on average lower than R-S (mean = -15.0% CO, sd = 6.5% CO, and median = -15.1), with lower and upper limits of agreement of -28.0% and -2.0%, respectively. The lower and upper limits of the 95% confidence intervals were -17.0 and -13.1 (P < 0.001, Student's t-test).
**CONCLUSIONS**: Shunt derived from MMIMS inert gas retention data correlated well with R-S during breathing of oxygen. Shunt as derived by MMIMS was generally less than R-S.

## 比较通过透射率和反射测定脉搏氧饱和度的仪器应用于血管外科手术

**A Comparison of Transmittance and Reflectance Pulse Oximetry During Vascular Surgery**

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Anesth Analg 2009 109: 1847-1849.

**背景**：相比于传统放置在指尖、跖、耳垂的通过透射率测定氧饱和度仪器在末梢低灌注患者的使用限制，新型的将探针放置在前额通过反射测定氧饱和度的仪器有一定改进。我们比较了血管手术使用这两种仪器的可靠性和准确性。
**方法**：患有外周血管疾病的患者行血管手术进行全麻，分别使用放置在耳垂通过透射率测定及放置在前额通过反射测定氧饱和度的仪器监测。使用两种仪器连续测定 $Spo_2$，同时抽取动脉血测定血气。我们记录了两种仪器每分钟的平均值，并通过 Bland-Altman 统计分析。
**结果**：20 名患者每分钟测定一次氧饱和度总共收集了 3993 对数据。两种仪器都没有测量失败超过 1 分钟。Bland-Altman 曲线显示了两种仪器的可信范围为－4.0%到 2.6%。分析了 14 名患者的 28 个动脉样本，$Sao_2$ 均与两种仪器测定的 $Spo_2$ 相接近。与 $Sao_2$ 相比较，探针放在耳垂的可信范围为－4.7%到 6.1%，探针放在前额的可信范围为－3.3%到 3.4%。
**结论**：新的放在前额的通过反射进行测定 $Spo_2$ 的仪器，相比于传统放在耳垂的仪器，应用于行血管外科手术的患者其准确性是可以接受的。
（陈珺珺译 薛张纲校）

**BACKGROUND:** New reflectance pulse oximetry probes placed on the forehead may be an improvement over transmittance probes placed on a finger, toe, or earlobe in patients with compromised perfusion. We compared the reliability and accuracy of the 2 types of probes in patients undergoing vascular surgery.
**METHODS:** Patients with peripheral vascular disease undergoing vascular surgery under general anesthesia were monitored with both a transmittance earlobe probe and a reflectance forehead probe. $Spo_2$ was recorded continuously from both probes, and arterial blood gas samples wereanalyzed when clinically indicated. The average values from both probes over each minute were compared using Bland-Altman analysis.
**RESULTS:** Twenty patients were included yielding a total of 3993 1-min averaged data pairs. Neither probe failed to report a value for more than 1 min. A Bland-Altman plot showed the limits of agreement between the probes of –4.0% to +2.6%. Twenty-eight arterial blood samples were analyzed for 14 patients and $Sao_2$ closely matched both $Spo_2$ probe values at the time of sampling. Compared with $Sao_2$, analysis demonstrated limits of agreement of –4.7% to 6.1% for ear and –3.3% to 3.4% for forehead sites.
**CONCLUSIONS:** The new reflectance forehead $Spo_2$ probe tested has acceptable agreement with the older transmittance probe placed on the earlobe for pulse oximetry within typical ranges of $Spo_2$ in patients undergoing vascular surgery.

## 综合困难气道处理方案使建立急性外科气道的需要减少

## Need for Emergency Surgical Airway Reduced by a Comprehensive Difficult Airway Program

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**背景**：不能为呼吸衰竭的病人进行气管插管和通气与并发症和死亡率显著相关。如果在气道管理方面有经验的麻醉医生或其他医疗保健提供者不能通过面罩为病人通气和/或通过直接喉镜气管插管，则认为该例为困难气道病人。
**方法**：我们对一个部门的资料进行了回顾性分析来分析综合困难气道处理方案是否使通过环甲膜穿刺或气管切开的外科处理来保证气道的需要减少。我们将综合困难气道处理方案开始前四年间（1992 年 1 月至 1995 年 12 月）报道的每年由于插管和通气失败而建立非计划的急性外科气道例数与该方案开始后 11 年（1996 年 1 月至 2006 年 12 月）的年例数进行比较。
**结果**：急性外科气道的例数从方案开始前 4 年间的 6.5 ± 0.5 例/年下降至方案开始之后 11 年间的 2.2 ± 0.89/年($P < 0.0001$)。1992 年 1 月至 1995 年 12 月的四年间，报道了 26 例急性外科气道，而之后 11 年（1996 年 1 月至 2006 年 12 月）却总共报道了 24 例外科气道。
**结论**：综合困难气道处理方案与 11 年间由于麻醉医生插管和通气失败而建立外科气道的病例数持续下降有关，虽然报道的困难气道例数在增加，每年接受麻醉的病人总数也在增加。
（姚敏敏译 薛张纲校）

**BACKGROUND:** Inability to intubate and ventilate patients with respiratory failure is associated with significant morbidity and mortality. A patient is considered to have a difficult airway if an anesthesiologist or other health care provider experienced in airway management is unable to ventilate the patient's lungs using bag-mask ventilation and/or is unable to intubate the trachea using direct laryngoscopy.
**METHODS:** We performed a retrospective review of a departmental database to determine whether a comprehensive program to manage difficult airways was associated with a reduced need to secure the airway surgically via cricothyrotomy or tracheostomy. The annual number of unplanned, emergency surgical airway procedures for inability to intubate and ventilate reported for the 4 yr before the program (January 1992 through December 1995) was compared with the annual number reported for the 11 yr after the program was initiated (January 1996 through December 2006).
**RESULTS:** The number of emergency surgical airways decreased from 6.5 ± 0.5 per year for 4 yr before program initiation to 2.2 ± 0.89 per year for the 11-yr period after program initiation ($P < 0.0001$). During the 4-yr period from January 1992 through December 1995, 26 surgical airways were reported, whereas only 24 surgical airways were performed in the subsequent 11-yr period (January 1996 through December 2006).
**CONCLUSIONS:** A comprehensive difficult airway program was associated with a reduction in the number of emergency surgical airway procedures performed for the inability of an anesthesiologist to intubate and ventilate, a reduction that was sustained over an 11-yr period. This decrease occurred despite an increase in the number of patients reported to have a difficult airway and an overall increase in the total number of patients receiving anesthesia per year.

## 自主通气对急性呼吸窘迫综合症患者肺换气分布的影响：气道压力释放通气与压力支持通气的比较

**The Impact of Spontaneous Ventilation on Distribution of Lung Aeration in Patients with Acute Respiratory Distress Syndrome: Airway Pressure Release Ventilation Versus Pressure Support Ventilation**

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**背景**：在这项研究中，我们尝试来决定气道压力释放通气（APRV）或者压力支持通气（PSV）两者中哪种模式更能减少急性肺损伤或急性呼吸窘迫综合症患者的肺不张。
**方法**：这是一项在重症监护室中所做的回顾性研究。在 2006 到 2007 年间，18 名急性肺损伤或急性呼吸窘迫综合症患者接受了 APRV 或 PSV，同时在 3 天内进行了 2 次螺旋 CT 扫描。
**结果**：APRV 组和 PSV 组（每组各含 9 名患者）的 CT 扫描数据经过三维重建和容量分析。肺充气区域（正常充气，充气不足，未充气和过度充气）由亨斯费尔德团队通过其密度来确定。在通气后，动脉血分压/吸入氧浓度比值和肺泡-毛细血管氧梯度在两组中都有所改善（P=0.008）；然而，在相同的气道压力下，APRV 组的改善大于 PSV 组。在 APRV 组中，肺不张显著减少，由 41% (范围, 17%–68%) 降至 19% (范围, 6%–40%)(P = 0.008)，肺正常充气区域体积显著上升，由 29% (范围, 13%–41%) 到 43% (范围, 25%–56%) (P = 0.008)。在 PSV 组中，肺容量没有改变。
**结论**：APRV 期间自主通气能通过减少肺不张来改善肺通气。PSV 能有效改善气体交换，但不能充分促进肺充气。这些结果表明了 APRV 在 ARDS 患者中作为主要的辅助通气模式，在减少肺不张方面比 PSV 更有效。
（俞佳译 薛张纲校）

**BACKGROUND**: In this study, we sought to determine which mode, airway pressure release ventilation (APRV) or pressure support ventilation (PSV), decreases atelectasis more in patients with acute lung injury/acute respiratory distress syndrome (ARDS).
**METHODS**: This was a retrospective study in the intensive care unit. Between 2006 and 2007, we identified 18 patients with acute lung injury/ARDS who received either APRV or PSV and had a helical computed tomography scan twice in 3 days.
**RESULTS**: Computed tomography data from the APRV and PSV groups (n = 9 each) were analyzed for 3-dimensional reconstruction and volumetry. Aerated lung regions (normally aerated, poorly aerated, nonaerated, and hyperinflated) were identified by their densities in Hounsfield units. The Pao2/Fio2 ratio and alveolar-arteriolar oxygen gradient after ventilation were improved in both groups (P = 0.008); however, the improvements in the APRV group exceeded those in the PSV group when delivered with equal mean airway pressure (P = 0.018 and 0.015, respectively). Atelectasis decreased significantly from 41% (range, 17%–68%) to 19% (range, 6%–40%) (P = 0.008) and normally aerated volume increased significantly from 29% (range, 13%–41%) to 43% (range, 25%–56%) (P = 0.008) in the APRV group, whereas lung volume did not change in the PSV group.
**CONCLUSIONS**: Spontaneous ventilation during APRV improves lung aeration by decreasing atelectasis. PSV for gas exchange is effective but not sufficient to improve lung aeration. These results indicate that APRV is more efficient than PSV as a mode of primary ventilatory support to decrease atelectasis in patients with ARDS.

# 晶体和胶体溶液对脊髓麻醉的剖宫产病人术中心输出量的影响

**The Effects of Crystalloid and Colloid Preload on Cardiac Output in the Parturient Undergoing Planned Cesarean Delivery Under Spinal Anesthesia: A Randomized Tria**

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Anesth Analg 2009 109: 1892-1900

**背景**：剖宫产病人在脊髓麻醉后低血压仍然是一个主要的临床问题。扩容与升压药一起被用于减少其发生率。以前的研究用无创血压测量和升压药的需求来评价扩容效果。我们分别在脊髓麻醉前后使用了多普勒血流测量技术来衡量已接受 3 份液体扩容的产妇心输出量（CO）和纠正时间（FTc，一种血容量测量方法）。我们认为胶体比晶体产生对心输出量增加更有效，低血压的发生率更低。

**方法**：60 位健康的计划腰麻下剖宫产的妇女被招募将于本随机，双盲研究。基线心率，收缩压（收缩压），二氧化碳，和 FTc 在左外侧倾斜的位置记录。病人随机在超过 15 分钟的时间里接受 3 份液体扩容：1.5 升晶体（哈特曼的解决方案），0.5 升 6%羟乙基淀粉（HES）溶液（HES0.5），或 1 升 6%6%羟乙基淀粉（HES）溶液（HES0.5）。扩容后每 30 分钟 5 分钟进一步的测量。 30 分钟后，椎管内给予 12.5 重比重布比卡因与芬太尼 15 微克，每 5 分钟或 20 分钟记录一次直到手术开始。主要结果，比较各组心输出量。低血压的发生率（定义为收缩压减少基础血压的 20%），麻黄碱使用和脐带血液气体也进行了比较。

**结果**：病人的特质，心率，血压各组相似。虽然各组扩容后心输出量和 FCt 均增加（P<0.005），但只有 HES1.0 组可保持至脊髓麻醉后（P<0.005）。其中有低血压的发生率（70%:35%: 65%分别对应哈特曼的解决方案，HES0.5，HES1.0，P 值= 0.069）和麻黄碱平均用量（10.4：5.7：9.7 毫克; P = 0.26）各组无差异。

**结论**：尽管 CO 和 FTc 扩容后增加，特别是使用 HES1.0 升，但仍然无法避免低血压的发生。数据表明，脊椎麻醉后心输出量的增加不足以弥补动脉压的下降。

（张玥琪译，薛张纲校）

**BACKGROUND:** Hypotension after spinal anesthesia for cesarean delivery remains a major clinical problem. Fluid preloading regimens together with vasopressors have been used to reduce its incidence. Previous studies have used noninvasive arterial blood pressure measurement and vasopressor requirements to evaluate the effect of preload. We used a suprasternal Doppler flow technique to measure maternal cardiac output (CO) and corrected flow time (FTc, a measure of intravascular volume) before and after spinal anesthesia after 3 fluid preload regimens. We hypothesized that colloid solutions, compared with crystalloid, would produce the largest increase in CO and have the lowest incidence of hypotension.

**METHODS:** Sixty healthy term women scheduled for planned cesarean delivery under spinal anesthesia were recruited for this randomized, double-blind study. Baseline heart rate, systolic blood pressure (SBP), CO, and FTc were recorded in the left lateral tilt position. Patients were randomized to receive 1 of 3 fluid preload regimens given over 15 min: 1.5 L crystalloid (Hartman's solution), 0.5 L of 6% w/v hydroxyethyl starch (HES) solution (HES 0.5), or 1 L of 6% w/v HES solution (HES 1.0). Further measurements were made after fluid loading every 5 min for 30 min. After 30 min, spinal anesthesia was induced with hyperbaric bupivacaine 12.5 mg with fentanyl 15 μg and recordings were continued every 5 min for 20 min or until surgery started. The primary outcome, CO, was compared among groups. The incidence of hypotension (defined as a 20% reduction in SBP from the baseline), ephedrine use, and umbilical cord blood gases were also compared.
**RESULTS:** Patient characteristics, heart rate, SBP, and cord gases were similar among groups. Although CO and FTc increased after preload in all groups ($P < 0.005$), this was only maintained with HES 1.0 after spinal anesthesia ($P < 0.005$). There were no differences among groups in the incidence of hypotension (70% vs 35% vs 65% for Hartman's solution, HES 0.5, and HES 1.0, respectively; $P = 0.069$) or mean ephedrine dose (10.4 vs 5.7 vs 9.7 mg; $P = 0.26$).
**CONCLUSION:** Despite CO and FTc increases after fluid preload, particularly with HES 1.0 L, hypotension still occurred. The data suggest that CO increases after these preload regimens cannot compensate for reductions in arterial blood pressure after spinal anesthesia.

## 产妇合并脊柱侧凸轴索麻醉的临床适应证

**Clinical implications of neuraxial anesthesia in the parturient with scoliosis**

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脊柱侧凸向轴索麻醉的实施和效果提出挑战。我们回顾了在合并未矫形或已经矫形（即，外科途径）的脊柱侧凸产妇应用轴索技术的所有文献。有 22 篇文献报道了共 117 例患者（未矫形 n=24, 已矫形 n=93）。其中，79%的未矫形患者和 69%的已矫形患者的轴索麻醉很成功。轴索麻醉在已经矫形的患者更具挑战，此组患者中实施困难的 90%为硬膜外麻醉。据报道， 103 例患者中有 3 位会出现合并症。我们为优化此类患者应用轴索麻醉技术的效果提供建议。
（张钊译 薛张纲校）

Scoliosis can pose challenges to the initiation and function of neuraxial anesthetics. We reviewed the available literature exploring neuraxial techniques in parturients with uncorrected or corrected (i.e., surgically instrumented) scoliosis. The 22 articles reported 117 attempted neuraxial procedures (uncorrected n = 24 and corrected n = 93). Of these procedures, 79% of uncorrected patients and 69% of corrected patients were successfully managed with neuraxial anesthesia. Procedures were typically more challenging in corrected patients; 90% of all reported difficulties in this subgroup involved epidural anesthetics. Complications were reported in 3 of 103 patients. We provide suggestions for optimizing efficacy of neuraxial techniques in these patients.

## 成人囊性纤维化患者的围手术期管理

**Perioperative Management of the Adult with Cystic Fibrosis**

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Anesth Analg 2009 109: 1949-1961

自 1938 年囊性纤维化(CF)首次在腹部疾病中被发现，对这类病人的治疗有了很大的改进。这些进步导致了该病患者的生存率及生活质量的显著提高。由于上述原因，现在大多数 CF 患者是成年人，而不是儿童。1989 年首先通过定位克隆发现了与 CF 相关的基因。尽管大家相信基因治疗的前景不错，但是目前基因治疗用于 CF 并不成功。尽管 CF 患者中 90%的病人死于肺部疾病，他们同时可以患有包括糖尿病在内的胰腺疾病，骨科疾病，肝脏疾病及泌尿生殖系统疾病。CF 患者围手术期管理要求很好地了解该疾病的病理生理变化。我们复习了该种疾病相关的概念，包括了肝移植、肺移植及怀孕等特殊问题的考虑。
（陈珺珺译 薛张纲校）

Since cystic fibrosis (CF) was first differentiated from celiac disease in 1938, the medical care of patients with CF has substantially improved. These improvements have resulted in a significant increase in median survival and the quality of life experienced by patients. The resultant increase in survival has caused the "average" CF patient to be a young adult and not a child. The gene that causes CF was first identified in 1989 and is the first gene discovered by positional cloning. Unfortunately, gene therapy for CF has not been successful, although it continues to hold great promise for future patient care. Although pulmonary disease is responsible for more than 90% of the morbidity and mortality in patients with CF, they also experience pancreatic disease, including diabetes mellitus, bone disease, hepatobiliary disease, and genitourinary disease. The optimal perioperative management of patients with CF requires an understanding of the relevant pathophysiology and the unique challenges presented by these patients. We reviewed these concepts, including special considerations such as liver and lung transplantation and pregnancy.

## 慢性疼痛患者鞘内注射吗啡对社会心理学方面的改善

**Improvement in Psychosocial Outcomes in Chronic Pain Patients Receiving Intrathecal Morphine Infusions**

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Anesth Analg 2009 109: 1981-1986

**背景:**对于慢性疼痛的患者，传统的多模式镇痛的效果是不理想的。尽管目前已使用植入式吗啡泵，但是这种有创的镇痛治疗对于患者社会心理学方面的影响尚存在争议。在这项回顾性研究中，我们评估了鞘内注射吗啡对于疼痛感觉及

社会心理学功能方面的影响。这项研究的另一个目的是评估鞘内注射吗啡后对患者机能活动的影响。

**方法：**30 名使用多模式镇痛无效的非恶性肿瘤的疼痛患者参与了这项研究，在使用鞘内吗啡输注泵前、输注后 3、12、24 个月后，分别给予 McGil 疼痛问卷调查表。在每次随访时，患者的疼痛程度使用 11 分制的疼痛评分表，即 0 分代表没有疼痛，10 分代表最痛。开始吗啡的用量为 0.23± 0.14 mg/天（范围从 0.09 至 0.75 mg/天），并且调整吗啡剂量使疼痛评分<50%初始值。同时在每次随访时调查不良反应、并发症及机能活动。

**结果：在随访的 24 个月中，患者疼痛的程度明显缓解。**McGill 疼痛问卷表改善了 66%，有效性改善了 59%，感觉成分改善了 32%。吗啡的平均用量在 3、12、24 个月时分别增加为 0.44 ± 0.29, 0.66 ± 0.39 和 0.80 ± 0.45 mg/天($P <$ 0.05)。慢性疼痛缓解后提高了社会、工作、家庭关系和生活质量。13 名尚在职年龄的患者中，12 名重新恢复了全日制工作；17 名退休患者中，14 名减少了帮助的要求。

**结论：**对于已使用多模式镇痛但效果不佳的慢性疼痛患者，鞘内使用植入式吗啡输注泵可以改善患者社会心理功能。

（陈珺珺译 薛张纲校）

**BACKGROUND:** When conventional multimodal analgesic therapy is unsuccessful, more aggressive analgesic treatments are required for patients with intractable chronic pain. Despite extensive clinical experience with implanted morphine pumps, there is still controversy regarding the psychosocial effects of this invasive analgesic therapy. In this prospective study, we evaluated the impact of intrathecal (IT) morphine infusions on pain perception and psychosocial functionality. A secondary objective of this pilot study was to assess the effect of IT morphine infusion on the patient's level of functional activity.

**METHODS:** Thirty patients with chronic nonmalignant pain that failed to respond to multimodal analgesic regimens were evaluated using the McGill Pain Questionnaire before and at 3-, 12-, and 24-mo intervals after implantation of an IT morphine infusion pump. At each clinic visit, the patient's level of pain was assessed using an 11-point visual analog scale, with 0 = no pain and 10 = worse pain imaginable. The mean initial morphine infusion rate was 0.23 ± 0.14 mg/day (with a range from 0.09 to 0.75 mg/day) and was subsequently adjusted to maintain their pain score at a value <50% of the initial value. Adverse side effects and complications, as well as activity levels, were recorded at each clinic visit.

**RESULTS:** Both evaluative and affective components of the pain assessment demonstrated a significant improvement over the 24-mo study period. The evaluative component of the McGill Pain Questionnaire improved 66%, the affective component 59%, and the sensory component 32%. The average morphine infusion rate increased to 0.44 ± 0.29, 0.66 ± 0.39, and 0.80 ± 0.45 mg/day at the 3-, 12-, and 24-mo follow-up intervals ($P < 0.05$). The reduced level of chronic pain leads to improved social, work, and family relationships and quality of life. Among 13 patients of working age, 12 returned to work full time, and among 17 retired patients, 14 had a reduced need for assistance.

**CONCLUSIONS:** IT infusion of morphine using an implantable pump was helpful in improving psychosocial function in patients with intractable pain that had failed to respond to standard multimodal analgesic therapy.

# 脊髓背侧角 Homer1 蛋白的早期改变与宽松结扎大鼠坐骨神经相关

# Early Changes in Homer1 Proteins in the Spinal Dorsal Horn Are Associated with Loose Ligation of the Rat Sciatic Nerve

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**背景**：脊髓背侧角的可塑性被认为至少是外周神经损伤后疼痛行为的部分基础。Homer1 蛋白通过功能依赖性突触后密度的重塑在突触可塑性中起重大作用。在这项研究中，我们测定了宽松结扎坐骨神经后早期脊髓背侧角神经元突触后密度中 Homer1a 和 Homer1b/c 蛋白的水平。

**方法**：雄性大鼠随机分入对照组、模拟手术组和坐骨神经结扎组。在坐骨神经暴露或结扎 4 小时后麻醉或处死动物。将脊髓背侧角同侧和对侧的 1/4 进行同质加工处理并离心，提取含突触后密度的 LP1 成分。用 Western 印迹法确定 Homer1 亚型。在一些动物中，术前鞘内注射 Homer1 小干扰 RNA 、非目标小干扰 RNA 、MK-801 或 U01026 来评估这些处理对 Homer1 亚型水平和损伤相关疼痛行为 2 种征兆（承重分配的移位和热痛觉过敏）的影响。

**结果**：在坐骨神经结扎的动物中，结扎同侧脊髓背侧角 LP1 成分中 Homer1a 蛋白水平增加而 Homer1b/c 蛋白水平降低，相反，结扎对侧和模拟手术动物的两侧蛋白水平均无改变。结扎前 2 小时鞘内注射 Homer1 小干扰 RNA 而非非目标小干扰 RNA 能阻止同侧 LP1 成分中 Homer1a 的聚集和 Homer1b/c 的流失。相同的预处理也能减轻结扎动物承重行为移位和热痛觉过敏。结扎前 15 分钟鞘内注射 MK-801 或 U0126 同样能抑制 Homer1 蛋白损伤相关的改变和疼痛的行为表现。

**结论**：同侧脊髓背侧角神经元突触后密度中 Homer1a 和 Homer1b/c 蛋白水平的结扎相关改变可能是损伤相关重塑的重要早期反映，这种重塑经过一定时间将导致持续性疼痛的产生。

（朱兰芳译 薛张纲校）

**BACKGROUND:** Plasticity in the spinal dorsal horn is thought to underlie, at least in part, pain behavior after peripheral nerve injury. Homer1 proteins play an important role in synaptic plasticity through an activity-dependent remodeling of the postsynaptic density (PSD). In this study, we examined the early consequences of the loose ligation of the sciatic nerve on the levels of Homer1a and Homer1b/c proteins in the PSD of spinal dorsal horn neurons.

**METHODS:** Male rats were randomly assigned to control, sham-operated, or ligated groups. Four hours after sciatic exposure or ligation, the animals were anesthetized and killed. Dorsal horn ipsilateral and contralateral quadrants were homogenized and centrifuged to obtain a PSD-containing LP1 fraction. Homer1 isoforms were identified in Western immunoblots. In some animals, Homer1 small interfering RNA (siRNA), nontarget siRNA, MK-801, or U01026 was injected intrathecally before surgery to assess the effects of this treatment on the levels of Homer1 isoforms and on 2 signs of injury-associated pain behavior, a shift in weight-bearing distribution and thermal hyperalgesia.

**RESULTS:** In ligated animals, the protein levels of Homer1a increased and those of Homer1b/c decreased in the ipsilateral LP1 fraction of the spinal dorsal horn. In contrast, no changes were detected in the contralateral LP1 fraction of ligated animals or the ipsilateral or contralateral LP1 fraction of sham-operated animals. Intrathecal injections of Homer1 siRNA, but not nontarget siRNA, 2 h before the ligation prevented the accumulation of Homer1a and loss of Homer1b/c in the ipsilateral LP1 fraction. The same pretreatment with Homer1 siRNA also alleviated both a shift in weight-bearing behavior and thermal hyperalgesia in the ligated animals. Intrathecal injections of MK-801 or U0126 15 min before the ligation similarly prevented the injury-associated changes in Homer1 protein levels and the behavioral signs of pain.
**CONCLUSION:** The ligation-associated changes in the protein levels of Homer1a and Homer1b/c in the ipsilateral PSD of spinal dorsal horn neurons may be an important early reflection of the injury-associated plasticity that in time leads to the development of persistent pain.

## 超声引导下刺激腓深神经诱发运动反应

## Ultrasound-Assisted and Evoked Motor Response Stimulation of the Deep Peroneal Nerve

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**背景：**我们观察了志愿者超声应引导下行腓深神经阻滞的效果。
**方法：**16 名志愿者两个脚行腓深神经阻滞。通过超声观察动脉及腓深神经的位置并行神经刺激。在注射局麻药前记录运动反应和/或感觉麻痹的反应情况。
**结果：**任何可以诱导出运动反应（跖伸或足背及外测肌肉收缩）或感觉异常地定位均可以使第一第二脚趾感觉完全阻断。
**结论：**通过超声引导下定位腓深神经，可以诱导运动及感觉异常，由此可以成功地行腓深神经阻滞。
（陈珺珺译 薛张纲校）
**BACKGROUND**: We performed an observational volunteer study to document an ultrasound-guided evoked motor response blockade of the deep peroneal nerve.
**METHODS**: Sixteen volunteers had deep peroneal nerve blocks in each foot. After visualization of the artery and the deep peroneal nerve with an ultrasound, the nerve was stimulated with a nerve stimulator. Evoked motor responses and/or paresthesia were noted before injection of the local anesthetic.
**RESULTS**: Any evoked motor response (extension of the toes or muscle contractions on the dorsum of the lateral aspect of the foot) or elicitation of paresthesia resulted in complete sensory blockade of the web between the big toe and second toe.
**CONCLUSIONS**: Visualization of the deep peroneal nerve with ultrasound followed by elicitation of an evoked motor response, or paresthesia, predicts successful blockade of the deep peroneal nerve.