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术前动脉脉压水平与下肢动脉搭桥术后围术期死亡率无明显关联

**Preoperative Arterial Pulse Pressure Has No Apparent Association with Perioperative Mortality After Lower Extremity Arterial Bypass**

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**背景**：在心脏手术患者中，动脉脉压性高血压与围术期的死亡率相关。但对于其他高手术风险人群，两者的相关性仍不得而知。本研究旨在验证术前动脉脉压的增加与下肢动脉搭桥术后30天和1年内所有原因引起的死亡率之间关系。

**方法**：对6年内（从2002年1月至2008年1月）单中心556名腹股沟下动脉搭桥手术患者进行回顾性分析。麻醉给药前，使用无创示波袖带测量平均动脉压、收缩压及舒张压，再根据收缩压减去舒张压计算得到脉压。在研究中使用社会保险死亡指数（social security death index，SSDI）确定所有受试者的死亡率，同时还记录了每位患者的合并症、术前用药及麻醉方法。然后使用单变量和多变量的分析方法评估动脉脉压与主要预后变量及所有病因引起的30天和1年内死亡率之间的关系。

**结果**：在556例患者中，大部分存在脉压升高（其中44.9%脉压大于80），30天的死亡率为5.1%，1年内的死亡率为17.8%。术前脉压值与30天及1年内的总死亡率均无明显相关性（p分别为0.35和0.14）。30天死亡率的独立预测因子为年龄≥80岁（p=0.02），ASA分级≥IV（p=0.04），肌酐的基础水平>2.0mg/dL（P<0.0001）及急诊手术（p=0.009）。这些因

素，另外还有修订后的李氏心脏风险指数评分、女性及以坏疽或溃疡作为手术指征，同样与1年内的死亡率相关。

**结论**：本次研究结果表明术前脉压升高可能与下肢动脉搭桥术后的总体死亡率无关。

（夏苏云 译 陈杰 校）

**BACKGROUND:** Arterial pulse pressure hypertension is associated with perioperative morbidity and mortality in cardiac surgery patients. However, its association with perioperative mortality in other high-risk surgical populations has not been determined. In this study, we tested the hypothesis that increased preoperative arterial pulse pressure is associated with 30-day and 1-year all-cause mortality after lower extremity arterial bypass surgery.

**METHODS:** A retrospective review of patients who had infrainguinal arterial bypass surgery at a single center over a 6-year period (January 2002 to January 2008) was performed ($n$ = 556). Mean, systolic, and diastolic arterial blood pressure were determined from a single noninvasive oscillometric blood pressure cuff reading in the operating room before the administration of anesthetic drugs. Pulse pressure was calculated from this measurement in a retrospective manner by subtracting diastolic pressure from systolic pressure. Mortality for all subjects was determined using the social security death index. Comorbid conditions, preoperative medications, and anesthetic techniques were recorded. Univariate and multivariate analyses were performed to evaluate the association between arterial pulse pressure and the primary outcome variables, and all-cause 30-day and 1-year mortality.

**RESULTS:** Of the 556 patients, a large percentage had elevated pulse pressure (44.9% had pulse pressure ≥80). Thirty-day mortality was 5.1% and 1-year mortality was 17.8%. There was no apparent association between preoperative pulse pressure and 30-day ($P$ = 0.35) or 1-year ($P$ = 0.14) all-cause mortality. Independent predictors of 30-day mortality were age ≥80 years ($P$ = 0.02), ASA physical status ≥IV ($P$ = 0.04), baseline creatinine >2.0 mg/dL ($P$ < 0.0001), and emergency surgery ($P$ = 0.009). The same variables were associated with 1-year mortality, as were the Lee's Revised Cardiac Risk Index score, female gender, and gangrene or ulcer as an indication for surgery.

**CONCLUSION:** Our results suggest that increased preoperative arterial pulse pressure might not be associated with all-cause mortality after lower extremity arterial bypass surgery.

## 综述：老年门诊患者接受日间手术时围手术期的监护

### Review Article: Perioperative Care for the Older Outpatient Undergoing Ambulatory Surgery

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随着日间手术的数量在老龄化社会日益增加，对于老年人围手术期的循证监护也日渐重要。在目前先进的麻醉，手术和监测技术下，门诊设施对接受择期手术的老年患者提供了潜在的优势。此综述总结了老年的生理、药理影响及其对于麻醉剂的反应。对老年门诊患者的术前评估最需要考虑的是合并症、基于过程的不同麻醉技术其优缺点以及对于日间手术术后并发症（包括谵妄、认知障碍、疲劳、头晕、疼痛和胃肠功能紊乱）处理的建议。本文讨论了此类患者日益增长的门诊手术所带来的挑战。当无法从同行评议类文献中得到老年手术人群的信息时，那么只能从其他门诊手术人群中提取相关信息。

（范逸臣 译 陈杰 校）

As the number of ambulatory surgery procedures continues to grow in an aging global society, the implementation of evidence-based perioperative care programs for the elderly will assume increased importance. Given the recent advances in anesthesia, surgery, and monitoring technology, the ambulatory setting offers potential advantages for elderly patients undergoing elective surgery. In this review article we summarize the physiologic and pharmacologic effects of aging and their influence on anesthetic drugs, the important considerations in the preoperative evaluation of elderly outpatients with coexisting diseases, the advantages and disadvantages of different anesthetic techniques on a procedural-specific basis, and offer recommendations regarding the management of common postoperative side effects (including delirium and cognitive dysfunction, fatigue, dizziness, pain, and gastrointestinal dysfunction) after ambulatory surgery. We conclude with a discussion of future challenges related to the growth of ambulatory surgery practice in this segment of our surgical population. When information specifically for the elderly population was not available in the peer-reviewed literature, we drew from relevant information in other ambulatory surgery populations.

## 兼容温度探头的改良磁共振显像运用于儿童的性能验证

**Performance Validation of a Modified Magnetic Resonance Imaging–Compatible Temperature Probe in Children**

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**摘要：**在磁共振成像(MRI)检查过程中,儿童很可能存在体温变化的风险。寒冷的MRI环境保保持MRI磁性，但可导致严重低体温。另一方面,因射频引起的组织加热可导致高热，尤其是长时间的检查。由于缺乏MRI兼容的核心温度探头、温度评估是不可靠的,并且必须计算特定吸收率相关的患者热增益来决定许可的扫描时间。本文比较MRI兼容的温度探头和改良的标准食道核心体温探测器在儿童中的应用结果。

**方法：**入组对象为行全身麻醉儿童,每个病人以自身对照。核心体温通过三种不同的设备测定: (1)一个贴于儿童皮肤表面的MRI兼容皮肤表面温度光纤探头(MRI-skin);(2)一个位于鼻咽部的MRI兼容温度光纤探头(MRI-core)，顶端配有一次性套筒;(3)位于食道或鼻咽的标准温度监控(STRD)。使用Bland-Altman方法进行统计分析。

**结果：**一共入组60名儿童，平均年龄为7.8±6岁(平均±标准差) ，平均体重为32.4(±26.4)kg。STRD和MRI-core核心温度测量之间的估计误差为0.06° C(可信区间[CI]:−0.02,0.15),STRD和MRI-skin之间估计误差为 1.19° C(CI:0.97,1.41)。根据Bland-Altman分析, STRD和MRI-skin探头以及和MRI-core探头95%的一致性区间分别为0.9-3.4,以及-1.3-1.2,。

**结论：**本文结果显示：在全身麻醉下行普外科手术的患儿中，标准食管测量核心温度和使用改良MRI-core探头测量核心温度之间具有良好的一致性。能够在MRI系统中准确评估核心温度可安全地延长检查时间,因此减少重复麻醉暴露,提高病人安全,提高儿童的监护质量。

（龚寅 译 陈杰 校）

**INTRODUCTION:** During magnetic resonance imaging (MRI), children are at risk for body temperature variations. The cold MRI environment that preserves the MRI magnet can cause serious hypothermia. On the other hand, hyperthermia may also develop because of radiofrequency-induced heating of the tissues, particularly in prolonged examinations. Because of a lack of MRI-compatible core temperature probes, temperature assessment is unreliable, and specific absorption rate–related patient heat gain must be calculated to determine the allowable scan duration. We compared an MRI-compatible temperature probe and a modification thereof to a standard esophageal core body temperature probe in children.

**METHODS:** Children undergoing general anesthesia were recruited, each patient serving as his/her own control. Core body temperature was measured using 3 different devices: (1) a fiberoptic MRI-compatible skin surface temperature probe (MRI-skin) located on the child's skin surface; (2) a fiberoptic MRI-compatible temperature probe modified with a single-use sleeve at the tip (MRI-core), located in the nasopharynx; and (3) a standard temperature monitor (STRD) located in the esophagus or nasopharynx. The Bland–Altman method was used for statistical analysis.

**RESULTS:** We enrolled 60 children aged 7.8 ± 6 years (mean ± SD) weighing 32.4 (±26.4) kg. The estimated difference between the STRD and MRI-core measurements of core temperature was 0.06°C (confidence interval [CI]: −0.02, 0.15), and between the STRD and the MRI-skin 1.19°C (CI: 0.97, 1.41). According to the Bland–Altman analysis, the 95% limits of agreement

ranged from −0.9 to 3.4 and from −1.3 to 1.2 between the STRD and the MRI-skin probe and the MRI-core probe, respectively.

**DISCUSSION:** Our results show good agreement between standard esophageal measurements of core temperature and core temperature measured using a modified MRI-core probe during general anesthesia in a general surgical pediatric population. The ability to accurately assess core temperature in the MRI suite may safely allow longer scan times and therefore reduce repeat anesthetic exposure, improve patient safety, and enhance the quality of care in children.

## 简报：分娩时宫外治疗时胎儿脐血的血清芬太尼浓度的量化

## Brief Report: Quantification of Serum Fentanyl Concentrations from Umbilical Cord Blood During Ex Utero Intrapartum Therapy

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给予胎儿芬太尼肌注经常在宫外分娩期治疗时应用（EXIT）。本文对脐静脉血液中芬太尼浓度进行定量，对来自13名胎儿的13个样本进行了分析。中位数和范围如下：分娩时新生儿体重为3000克（2020-3715克）。芬太尼肌注剂量为60微克（45-65微克）。肌注芬太尼到样本采集之间的时间为37分钟（5-86分钟）。芬太尼在所有的样本均检测到，血清浓度中位数为14.0纳克/毫升（4.3-64.0纳克/毫升）。

（俞劼晶 译 陈杰 校）

Fetal IM injection of fentanyl is frequently performed during ex utero intrapartum therapy (EXIT procedure). We quantified the concentration of fentanyl in umbilical vein blood. Thirteen samples from 13 subjects were analyzed. Medians and ranges are reported as follows. Weight of the newborn at delivery was 3000 g (2020–3715 g). The dose of fentanyl was 60 μg (45–65 μg). The time between IM administration of fentanyl and collection of the sample was 37 minutes (5–86 minutes). Fentanyl was detected in all of the samples, with a median serum concentration of 14.0 ng/mL (4.3–64.0 ng/mL).

## 急性等容血液稀释可加重小鼠脊髓缺血后的神经损伤

## Acute Normovolemic Hemodilution Can Aggravate Neurological Injury After Spinal Cord Ischemia in Rats

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**背景**：急性等容血液稀释（Acute Normovolemic hemodilution, ANH）常应用于胸腹部的主动脉手术中。然而，ANH对脊髓缺血性损伤的效应目前尚不清楚。由于在低于一定水平血细胞压积进行血液稀释可加重脑缺血后的神经损伤，因此本文假设ANH可加重脊髓缺血后的神经损伤。本实验目的在于研究ANH对于脊髓缺血损伤的影响。

**方法**：30只雄性sprague-Dawley小鼠被随机分为3组：非血液稀释组（组C）、目标血细胞比容30%组（HD30组）以及目标血细胞比容25%组（HD25组）。通过抽血及同时行等容量羟乙基淀粉输注来建立ANH模型。脊髓缺血和再灌注通过在腹主动脉放置顶端带气囊的导管完成，并记录平均动脉压的变化。术后连续7天使用运动障碍评分（motor deficit score, MDS）（0=正常，5=完全截瘫）分析和记录下肢神经功能。在最后的MDS分析后，计算脊髓内运动神经元的数量。

**结果**：HD25组在ANH过程后期出现低血压。C组和HD30组经历了3分钟的再灌注低血压，而HD25组经历了6分钟的低血压。HD25组中有2只小鼠在实验过程中死亡。再灌注后7天，C组、HD30组和HD25组的MDS中位数分别是1.0（0.5–2.00）、1.0（0.5–2.0）和 4.0（2.8–4.2）（95%可信区间）。和C组比较，HD25组的MDS显著升高（矫正p=0.0018；中位数差异95%区间：1.0-3.5）。C组、HD30组和HD25组的脊髓前角运动神经元的数量分别是：26.5（25.0–27.5）、23.5（22.0–26.5）和12.5（8.4–16.6）（中位数[95%可信区间]）。HD25组的运动神经元数量显著低于C组（矫正p<0.0001，中位数差异95%可信区间：9.0-18.0）。

**结论**：本实验研究结果显示：术中血细胞比容低至25%的ANH，同时伴随低血压可导致再灌注期间平均动脉压基线回复的延迟，并加重脊髓缺血后神经系统的预后。*1*

（俞芳 译 陈杰 校）

**BACKGROUND:** Acute normovolemic hemodilution (ANH) is currently performed during thoracoabdominal aortic surgery. However, the effects of ANH on spinal cord ischemic injury are currently unknown. Because hemodilution below a certain level of hematocrit (Hct) aggravates the neurological damage after cerebral ischemia, we hypothesized that ANH may increase neurological damage after spinal cord ischemia. The aim of these experiments was to determine the effects of ANH on spinal cord ischemic injury.

**METHODS:** Thirty male Sprague-Dawley rats were randomly assigned to 1 of the following 3 groups: no hemodilution (group C), target Hct level of 30% (group HD30), and target Hct level of 25% (group HD25). ANH was performed upon withdrawal of blood and simultaneous

replacement with the same volume with hydroxyethyl starch. Spinal cord ischemia and reperfusion were induced by using a balloon-tipped catheter placed in the descending thoracic aorta, and changes in mean arterial blood pressure were recorded. Neurological function of the hindlimbs was evaluated for 7 days and recorded using a motor deficit score (MDS) (0 = normal; 5 = complete paraplegia). The number of motor neurons within the spinal cord was counted after final MDS evaluation.

**RESULTS:** Group HD25 developed hypotension during the latter part of the ANH procedure. Group C and group HD30 experienced 3 minutes of reperfusion hypotension, whereas 6 minutes of hypotension was observed in group HD25. Two rats in group HD25 died during the experimental period. Seven days after reperfusion, the MDS of group C, group HD30, and group HD25 was 1.0 (0.5–2.0), 1.0 (0.5–2.0), and 4.0 (2.8–4.2) (median [95% confidence interval]), respectively. Group HD25 showed significantly higher MDS compared with group C (corrected $P = 0.0018$; 95% CI for median difference = 1.0–3.5). Motor neuron numbers in the anterior horns of group C, group HD30, and group HD25 were 26.5 (25.0–27.5), 23.5 (22.0–26.5), and 12.5 (8.4–16.6) (median [95% CI]), respectively. Motor neuron numbers of group HD25 were significantly lower than those of group C (corrected $P < 0.0001$; 95% CI for median difference = 9.0–18.0).

**CONCLUSION:** The results of the present study indicate that intraoperative ANH to an Hct of 25%, combined with coincident hypotension, caused a delayed recovery of baseline mean arterial blood pressure during the reperfusion period and aggravated neurological outcome after spinal cord ischemia.

## 超声引导的髂腹股沟/髂腹下神经阻滞治疗持续性腹股沟疝修补术后疼痛研究：一项随机，双盲，安慰剂对照，交叉临床试验

## Ultrasound-Guided Ilioinguinal/Iliohypogastric Nerve Blocks for Persistent Inguinal Postherniorrhaphy Pain: A Randomized, Double-Blind, Placebo-Controlled, Crossover Trial

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**背景**:髂腹股沟和髂腹下神经阻滞常用于临床治疗腹股沟疝修补术后持续疼痛的治疗，但关于此内容还没有对照研究发表。本对照试验探究了超声引导下对髂腹股沟和髂腹下神经注射利多卡因进行神经阻滞的镇痛和感觉效应

**方法**：该随机，双盲，安慰剂对照，交叉试验纳入12名患有严重腹股沟疝修补术后持续疼痛的患者，与12名健康人进行对照。在每次超声引导神经阻滞前后在腹股沟区域进行评估，内容包括采用标准化数值评级疼痛量表（0-10），冷轧辊感觉投射，以及定量感觉试验（QST）。进针方向为髂前上棘上内侧1-2cm。预后为疼痛评分，感觉投射以及QST的阻滞前后变化。利多卡因有反应定义为注射

利多卡因阻滞后疼痛减轻≥80%或者注射安慰剂后疼痛减轻≤25%。利多卡因无反应定义为注射利多卡因阻滞后疼痛减轻＜80%或注射安慰剂后疼痛减轻≤25%，安慰剂反应定义为注射安慰剂后疼痛减轻＞25%。

**结果:**12名疼痛患者中1名对利多卡因有反应，6名对利多卡因无反应，5名对安慰剂有反应。利多卡因阻滞后未发现QST改变。在健康人对照组中，10名健康者在利多卡因阻滞后腹股沟区冷感觉减退。另外，QST检查显示与安慰剂阻滞相比，利多卡因阻滞组腹股沟区超阈值的热痛觉反应显著降低（95%可信区间=-3.5~-0.5，$P$ = 0.008）

**结论**：使用利多卡因在超声引导的髂前上棘水平阻滞髂腹股沟和髂腹下神经对持续性腹股沟疝修补术后疼痛的诊断和治疗无效。

（陆秉玮 译 陈杰 校）

**BACKGROUND:** Ilioinguinal and iliohypogastric nerve blocks are used in the clinical management of persistent inguinal postherniorrhaphy pain, but no controlled studies have been published on the subject. In this controlled study, we investigated the analgesic and sensory effects of ultrasound-guided blocks of the ilioinguinal and iliohypogastric nerves with lidocaine.

**METHODS:** A randomized, double-blind, placebo-controlled, crossover trial in 12 patients with severe persistent inguinal postherniorrhaphy pain, including a control group of 12 healthy controls, was performed. Assessments included pain ratings under standardized conditions with numerical rating scale (0–10), sensory mapping to a cool roller, and quantitative sensory testing (QST), in the groin regions, before and after each ultrasound-guided block. A needle approach of 1 to 2 cm superior and medial to the anterior superior iliac spine was used. Outcomes were changes in pain ratings, sensory mapping, and QST compared with preblock values. Lidocaine responders were a priori defined by a pain reduction of ≥80% after lidocaine block and ≤25% after placebo block, nonresponders by pain reduction of <80% after lidocaine block and ≤25% after placebo block, and placebo responders by pain reduction of >25% after placebo block.

**RESULTS:** One of 12 pain patients was a lidocaine responder, 6 patients were nonresponders, and 5 patients were placebo responders. No consistent QST changes were observed in patients after the lidocaine block. In 10 of 12 healthy controls, a cool hypoesthesia area developed in the groin after the lidocaine block. Furthermore, QST assessments demonstrated significantly decreased suprathreshold heat pain perception in the groin after lidocaine versus placebo blocks (95% confidence interval = −3.5 to −0.5, $P$ = 0.008).

**CONCLUSION:** Ultrasound-guided lidocaine blocks of the ilioinguinal and iliohypogastric nerves, at the level of the anterior superior iliac spine, are not useful in diagnosis and management of persistent inguinal postherniorrhaphy pain.

## 多肽和脂质大麻素在脊髓水平对关节痛的影响

**The Effects of Peptide and Lipid Endocannabinoids on Arthritic Pain at the Spinal Level**

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**Abstract**

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背景：Hemopressin，是一个从血红蛋白的α链上裂解的一个九肽（序列：PVNFKFLSH），和神经大麻素CB1受体有特异性相互作用。因此，它似乎是唯一的与大麻活动相关的肽结构。此项研究的目标是进一步描述此肽，并通过研究多不饱和脂肪酸衍生物、2 arachidonoyl（2-AG）和花生四烯酸乙醇胺在脊髓水平对机械痛的影响来显示它们的镇痛效能。

方法：从原位中和反应固相制备HP。长期鞘内置管后，对雄性Wistar大鼠后肢的胫附关节处注射卡拉胶（300ug/30ul）以产生机械性超敏。在注射卡拉胶三小时后，鞘内注射配体。使用动态触觉测定仪来评估机械阈值。

结果：2-AG (1-200 μg) 和 花生四烯酸乙醇胺 (10-200 μg)剂量依赖性降低卡拉胶介导的机械痛觉超敏，而HP在较宽的剂量范围内（0.3-30 μg）没有镇痛作用。2-AG的作用可使用CB1受体拮抗剂AM251拮抗，而非CB2受体拮抗剂SSR144528-2。HP（3 and 30 μg）同样也抑制2-AG的作用。所有配体都不影响水肿的程度。

结论：HP后处理对机械痛觉超敏没有作用，而鞘内注入2-AG和anandamide对此有效。

（滕凌雅 译 陈杰 校）

**BACKGROUND:** Hemopressin, a nonapeptide (PVNFKFLSH: HP) derived from the α chain of hemoglobin was shown to interact specifically with brain cannabinoid $CB_1$ receptors. Therefore, it seems to be the only peptide structure with cannabinoid activities. Our goal in this study was to further characterize this peptide and to clarify the antinociceptive potency of the polyunsaturated fatty acid derivates, 2-arachidonoyl-glycerol (2-AG) and anandamide, by investigating their effects on mechanical allodynia at the spinal level.

**METHODS:** HP was prepared on solid phase by in situ neutralization. After chronic intrathecal catheterization, mechanical hypersensitivity was produced in male Wistar rats by injection of carrageenan (300 μg/30 μL) into the tibiotarsal joint of one of the hind legs. Three hours after carrageenan administration, the ligands were administered intrathecally. The mechanical threshold was assessed using a dynamic aesthesiometer.

**RESULTS:** 2-AG (1–200 μg) and anandamide (10–200 μg) decreased carrageenan-induced mechanical allodynia in a dose-dependent manner, whereas HP had no antinociceptive effect in a wide dose range (0.3–30 μg). The effect of 2-AG was prevented by the $CB_1$ receptor antagonist AM 251, but not by the $CB_2$ antagonist SSR144528-2. HP (3 and 30 μg) also inhibited the effect of 2-AG. None of the ligands influenced the degree of edema.

**CONCLUSIONS:** HP posttreatment had no effect on mechanical allodynia, whereas spinally injected 2-AG and anandamide were potent drugs.

## 简报：采用弱磁场处理重比重利多卡因，：一项初步研究

**Brief Report: Manipulation of Hyperbaric Lidocaine Using a Weak Magnetic Field: A Pilot Study**

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麻醉平面过高是椎管内麻醉潜在可能致命的并发症，每1000例病例发生率为0.6。目前的预防方法包括减少局部麻醉药物的剂量和改变病人的体位，如此方式使脑脊液中重比重麻醉药物的位置可通过重力作用进行调节。将一种带磁性流体加入局麻溶液中，在体外脊椎模型中联合一个外部磁场，可以抗重力地控制带磁性流体，染料和
局部麻醉的位置，此法提示利用另一作用机制，麻醉者能预防麻醉平面过高。

（孙晓琼 译 陈杰 校）

High spinal block is a potentially fatal complication of spinal anesthesia, with an incidence of 0.6 per 1000. Current prevention strategies include decreasing the dose of local anesthetic drug and altering patient positioning such that the location of hyperbaric anesthetic drugs in the neuraxis can be manipulated by gravity. Incorporation of a ferrofluid into a local anesthetic solution, combined with application of an external magnetic field in an in vitro spine model, allowed control of position of a solution of ferrofluid, dye, and local anesthetic against gravity, suggesting an additional mechanism by which anesthesia providers may prevent high spinal block.

## 术前脉压和下肢血管搭桥术后较大的心血管不良事件

**Preoperative Pulse Pressure and Major Perioperative Adverse Cardiovascular Outcomes After Lower Extremity Vascular Bypass Surgery**

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背景：已有研究发现术前高脉压（PP）是冠脉搭桥术后较大的心血管不良事件（MACEs）的一个预测因子。在本研究中，我们评估了在因外周血管疾病行下肢血管搭桥手术的病人，术前高PP对于鉴别MACEs的预测能力。

方法：我们通过在我们机构预先收集的血管手术的数据库确定了412名在2003年1月至2004年12月之间行下肢血管搭桥手术的病人。记录术前统计学资料包括合并症、使用药物、术中情况以及术后MACEs的发生（心肌梗死、充血性心力衰竭、中风以及院内死亡）。PP数值作为连续分类变量（PP <80或≥80 mm Hg）来检验术后MACs的预测能力。建立最终的对数回归来评估PP的预测能力。

结果：PP<80mmHg组病人5.7%出现MACEs，而PP ≥80 mm Hg组为8.8%（*P*=0.229）。发生MACEs病人年龄更大（76 ± 10岁比68 ± 12岁；*P* = 0.001），有心肌梗死病史（9%比4%；*P* = 0.049），术前PP较高（75 ± 19 mm Hg比71 ± 21 mm Hg；*P* = 0.306)。在最终的对数回归模型中，只有年龄是MACEs的预测因子（优势比1.062；95%置信区间1.02–1.10；*P* = 0.02）。PP ≥80 mm Hg和MACEs的发生率之间没有关系（优势比1.36，95%置信区间0.62–2.90; *P* = 0.44）。

结论：对于行下肢血管再通手术病人，术前高PP不是心血管不良事件的预测因子。

（安光惠 译 马皓琳 李士通 校）

BACKGROUND: Preoperative increased pulse pressure (PP) has been found to be a predictor of major adverse cardiovascular events (MACEs) after coronary artery bypass graft surgery. In this study, we evaluated the predictive ability of increased preoperative PP to identify MACEs in patients with peripheral vascular disease undergoing lower extremity vascular bypass surgery.

METHODS: We used the prospectively collected vascular surgery database at our institution to identify 412 consecutive patients who had lower extremity bypass surgery between January 2003 and December 2004. Preoperative demographics including comorbidities, medications, intraoperative characteristics, and postoperative MACE outcomes (myocardial infarction, congestive heart failure, stroke, and in-hospital mortality) were recorded. PP data as a continuous and categorical variable (PP <80 or ≥80 mm Hg) were tested for the ability to predict postoperative MACEs. A final parsimonious logistic regression was built to evaluate the predictive ability of PP.

RESULTS: MACEs occurred in 5.7% of patients in the PP <80 mm Hg group compared with 8.8% in the PP ≥80 mm Hg group (*P* = 0.229). Patients with MACEs were older (76 ± 10 years vs 68 ± 12 years; *P* = 0.001), had a history of myocardial infarction (9% vs 4%; *P* = 0.049), and had a preoperative PP of 75 ± 19 mm Hg vs 71 ± 21 mm Hg (*P* = 0.306). In the final logistic regression model, only age in years was a predictor of MACEs (odds ratio, 1.062; 95% confidence interval, 1.02–1.10; *P* = 0.02). There was no relationship between PP ≥80 mm Hg and risk for MACEs (odds ratio, 1.36; 95% confidence interval, 0.62–2.90; *P* = 0.44).

CONCLUSIONS: Preoperative increase in PP is not a predictor of adverse cardiovascular outcomes in patients having lower extremity revascularization surgery.

## 大麻素Ⅰ型受体抑制引起试验性脓毒症动物在麻醉诱导期间的癫痫发作

**Cannabinoid Receptor 1 Inhibition Causes Seizures During Anesthesia Induction in Experimental Sepsis**

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我们报导了用大麻素Ⅰ型受体（CB1R）拮抗剂对试验性的脓毒症进行处理的动物在麻醉诱导中的癫痫发作。先给动物行升结肠扩张支架腹膜炎诱发脓毒症或行假手术，然后用CB1R拮抗剂、CB1R激动剂或安慰剂处理。14小时后，给予动物们戊巴比妥或氯胺酮行麻醉诱导，并观察了其行为学改变。12例由CB1R拮抗剂处理的脓毒症动物在戊巴比妥麻醉诱导后有5例出现强直阵挛性癫痫发作。数据显示，CB1R抑制与戊巴比妥联合使用可能增加了脓毒症病例在麻醉药诱导癫痫发作的发生率。

（毛祖旻 译　李士通 马皓琳 校）

We report on seizures during anesthesia induction in animals treated with a cannabinoid receptor 1 (CB1R) antagonist for experimental sepsis. Animals received surgery for colon ascendens stent peritonitis–induced sepsis or sham surgery followed by treatment of CB1R antagonist, CB1R agonist, or placebo. Fourteen hours later, animals received pentobarbital or ketamine for anesthesia induction and animal behavior was observed. Tonic-clonic seizures were observed in 5 of 12 septic animals (42%) treated with CB1R antagonist after induction of anesthesia with pentobarbital. The data suggest that CB1R inhibition in combination with pentobarbital may increase the incidence of anesthetic-induced seizures in the case of sepsis.

## 多个储液器增加术中细菌传染

**Multiple Reservoirs Contribute to Intraoperative Bacterial Transmission**

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背景：术中活塞污染是一个与增加患者死亡率相关的常见事件。本研究中笔者检测麻醉提供者的手、患者、患者环境对活塞污染的相对贡献。笔者的次要目的是确定活塞污染的风险因素并检测活塞污染与术后30天感染和死亡率的优先关系。进行额外的微生物学分析以确定术中细菌的储液器中细菌病原体的传播。脉冲场凝胶电泳用于评估储液器细菌病原学对术后30天细菌感染的贡献。

方法：在本多中心研究中，在274间手术室中观察活塞传染事件，以每个手术室每天的第一和第二例手术为研究序列以确定案例中和案例间的传播案例。对储液器进行细菌培养，并与活塞设备隔离群相比较，以明确活塞阀污染的来源。案例间传播的定义是由后续案例（案例2）的活塞设备获得一个或多个菌株的分离，该菌株和前面案例（案例1）储液器菌株完全相同。案例内传播定义为从活塞设备获得的1个或多个细菌菌株的分离，与同一案例的细菌储液罐完全相同。鉴定这些储液罐中的细菌病原体，并评估它们对术后感染的潜在贡献。所有患者随访术后30天的感染进展和全因死亡。

结果：检测到活塞污染发生率为23%（548例中的126例），证实了14例案例间和30例案例内传播事件。
所有的3个储液器对案例间（64%环境，14%患者和21%提供者）和案例内（47%环境，23%患者和30%提供者）的活塞污染有贡献。环境是一个与提供者的手（相对风险[RR]为1.91，置信区间[CI]为1.09至3.35，*P*= 0.029）或患者（RR =2.56，CI为1.34至4.89，*P* = 0.002）相比更可能的活塞污染源。医院地点（优势比[OR]为5.09，CI为2.02至12.86，*P* = 0.001）和案例2（OR6.82，CI为4.03至11.5，*P*
<0.001）是活塞污染的显著预测因子。活塞污染和死亡率的增加相关（OR为58.5，CI为2.32至1477，P=0.014）。术中患者和提供者手的细菌污染和术后30天感染发生相关。

结论：患者、提供者的手和环境的细菌污染促成了活塞传染事件，但患者周围环境是更可能的来源。活塞污染和患者死亡率增高相关。患者和供应者细菌储液器促成术后30天感染。旨在针对这些储液器的平行多模式项目应当作为一个全面减少术中细菌传播的方法被充分研究。

（许辛译 马皓琳 李士通 校）

BACKGROUND: Intraoperative stopcock contamination is a frequent event associated with increased patient mortality. In the current study we examined the relative contributions of anesthesia provider hands, the patient, and the patient environment to stopcock contamination. Our secondary aims were to identify risk factors for stopcock contamination and to examine the prior association of stopcock contamination with 30-day postoperative infection and mortality. Additional microbiological analyses were completed to determine the prevalence of bacterial pathogens within intraoperative bacterial reservoirs. Pulsed-field gel electrophoresis was used to assess the contribution of reservoir bacterial pathogens to 30-day postoperative infections.

METHODS: In a multicenter study, stopcock transmission events were observed in 274 operating rooms, with the first and second cases of the day in each operating room studied in series to identify within- and between-case transmission events. Reservoir bacterial cultures were obtained and compared with stopcock set isolates to determine the origin of stopcock contamination. Between-case transmission was defined by the isolation of 1 or more bacterial isolates from the stopcock set of a subsequent case (case 2) that were identical to reservoir isolates from the preceding case (case 1). Within-case transmission was defined by the isolation of 1 or more bacterial isolates from a stopcock set that were identical to bacterial reservoirs from the same case. Bacterial pathogens within these reservoirs were identified, and their potential contribution to postoperative infections was evaluated. All patients were followed for 30 days postoperatively for the development of infection and all-cause mortality.

RESULTS: Stopcock contamination was detected in 23% (126 out of 548) of cases with 14 between-case and 30 within-case transmission events confirmed. All 3 reservoirs contributed to between-case (64% environment, 14% patient, and 21% provider) and within-case (47% environment, 23% patient, and 30% provider) stopcock transmission. The environment was a more likely source of stopcock contamination than provider hands (relative risk [RR] 1.91, confidence interval [CI] 1.09 to 3.35, $P = 0.029$) or patients (RR 2.56, CI 1.34 to 4.89, $P = 0.002$). Hospital site (odds ratio [OR] 5.09, CI 2.02 to 12.86, $P = 0.001$) and case 2 (OR 6.82, CI 4.03 to 11.5, $P < 0.001$) were significant predictors of stopcock contamination. Stopcock contamination was associated with increased mortality (OR 58.5, CI 2.32 to 1477, $P = 0.014$). Intraoperative bacterial contamination of patients and provider hands was linked to 30-day postoperative infections.

CONCLUSIONS: Bacterial contamination of patients, provider hands, and the environment contributes to stopcock transmission events, but the surrounding patient environment is the most likely source. Stopcock contamination is associated with increased patient mortality. Patient and provider bacterial reservoirs contribute to 30-day postoperative infections. Multimodal programs designed to target each of these reservoirs in parallel should be studied intensely as a comprehensive approach to reducing intraoperative bacterial transmission.

## 青少年患者在单次术后鼻内给药后酮咯酸的药代动力学

**The Pharmacokinetics of Ketorolac After Single Postoperative Intranasal Administration in Adolescent Patients**

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背景：给予酮咯酸氨丁三醇（酮咯酸）可减少术后阿片类药物的需求。对儿童鼻内给予酮咯酸氨丁三醇的药代动力学特征尚未研究过。本研究的目的是确定青少年患者鼻内单个剂量的酮咯酸的药代动力学。

方法：录入20例年龄12~17岁的手术患者。术后用专用的给药系统给予患者鼻内酮咯酸15 mg（体重≤50 kg）或30mg（体重>50 kg）。在给药前15min内（基础值）及给药后1、2、3、4、6、8、12和24小时获得血样用于酮咯酸含量测定。用非线性混合效应模型进行人群分析。将参数估计标准化到70kg的人。

结果：青少年鼻内给药能很好地耐受，不良反应极小。有一级吸收和排除的单室模型能令人满意地描述时间－浓度特性。人群参数估计（个体差异）为清除率（CL/F）2.05 L/h（60.5%）、分布容积（V/F）15.2L（32.4%）、吸收半衰期（$t_{1/2}$abs）0.173 h（25.0%）。达到浓度峰值的时间为52 min（SD 6 min）。

结论：通过鼻内途径给予酮咯酸使血浆浓度快速升高，对于青少年可能是静脉内注射的有用治疗替代，因为通过此装置达到的血浆浓度很可能是有镇痛作用的（研究用新药编号62,829）。

（马皓琳 译 李士通 校）

BACKGROUND: Ketorolac tromethamine (ketorolac) administration reduces postoperative opioid requirements. The pharmacokinetic characteristics of intranasal ketorolac tromethamine in children have not been characterized. Our objective of this study was to determine the pharmacokinetics of a single intranasal dose of ketorolac in adolescent patients.

METHODS: Twenty surgical patients, ages 12 to 17 years, were enrolled. After surgery, subjects received intranasal ketorolac 15 mg (weight ≤50 kg) or 30 mg (weight >50 kg) using a proprietary administration system. Blood samples were obtained for ketorolac assay at baseline (within 15 minutes before the dose) and at 0.5, 1, 2, 3, 4, 6, 8, 12, and 24 hours after the dose. A population analysis was undertaken using nonlinear mixed-effects models. Parameter estimates were standardized to a 70-kg person.

RESULTS: The intranasal dosing in adolescents was well tolerated with minimal adverse effects. A 1-compartment model with first-order absorption and elimination was satisfactory to describe time-concentration profiles. Population parameter estimates (between subject variability) were clearance (CL/F) 2.05 L/h (60.5%), volume of distribution (V/F) 15.2 L (32.4%), absorption half-life ($t_{1/2}$abs) 0.173 hour (25.0%). Time to peak concentration (Tmax) was 52 minutes (SD 6 minutes).

CONCLUSION: Administration of ketorolac by the intranasal route resulted in a rapid increase in plasma concentration and may be a useful therapeutic alternative to IV injection in adolescents because plasma concentrations attained with the device are likely to be analgesic (investigational new drug no. 62,829).

## 动脉内注射维拉帕米治疗脑血管痉挛后的血流动力学稳定性

**Hemodynamic Stability After Intraarterial Injection of Verapamil for Cerebral Vasospasm**

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背景:血管痉挛是蛛网膜下腔出血后一项常见并可能威胁生命的并发症。血管痉挛的治疗包括动脉内注射维拉帕米使其进入大脑血管系统。根据临床经验，动脉内注射维拉帕米后多数病人会出现收缩压急剧降低。我们研究的目的是(1)确认动脉内注射维拉帕米对脑血管痉挛病人平均动脉压（MAP）和心率（HR）的影响；（2）确定不同维拉帕米剂量对平均动脉压和心率变化的影响。我们假设（1）选择性的动脉内注射维拉帕米治疗脑动脉血管痉挛与平均动脉压降低和心率增快有关，（2）平均动脉压和心率的变化与使用的维拉帕米剂量呈线性相关。

方法:我们预先研究了患有血管痉挛需行脑血管造影术且可能行动脉内注射维拉帕米治疗的病例。所有病例均给予一个全身麻醉药。术中连续监测动脉有创血压和心率，并且每隔10秒记录数据。我们鉴定了注射维拉帕米前后最低平均动脉压和最快心率。用重复计量多元回归分析确定动脉内注射维拉帕米与平均动脉压和心率的变化之间的相关性，并调整潜在混杂因素（体重，术前升压药的使用和注射前平均动脉压）。以修正系数和95%可信区间形式报导数据。

结果：我们收录了20个病例，共行46次动脉内注射维拉帕米。在我们的多变量模型基础上，我们观察到每次动脉内注射5mg维拉帕米，平均动脉压平均下降3.5mmHg(95% CI −5.0～ −2.0, $P <$ 0.001)。动脉内注射维拉帕米后无论经未校准分析还是校准分析后显示心率均无显著性变化（每次动脉内注射5mg维拉帕米，心率无显著意义地增加0.4次/分，95% CI −1.6～2.4, $P = 0.70$）。

结论：全麻下，动脉内注射维拉帕米使其进入脑内动脉能降低平均动脉压但是通常的患者心率无变化。需行进一步研究以确定这些结果的临床意义。

BACKGROUND: Vasospasm after subarachnoid hemorrhage is a common and potentially life-threatening complication. Treatment of vasospasm may include intraarterial (IA) injections of verapamil into the cerebral vasculature. Clinical experience suggests that the average patient experiences an acute reduction in systemic blood pressure after IA verapamil. Our study objective was to (1) identify the effects of IA injection of verapamil on mean arterial blood pressure (MAP) and heart rate (HR) in patients with cerebral vasospasm and (2) determine the effect of verapamil dose on change in MAP and HR. We hypothesized that (1) selective IA injection of verapamil for treatment of cerebral vasospasm is associated with a reduction in MAP and an increase in HR and (2) the change in MAP and HR are linearly related to the dose of verapamil administered.

METHODS: We prospectively studied subjects with vasospasm scheduled for cerebral angiography with possible IA injection of verapamil. All subjects were given a general anesthetic. Invasive arterial blood pressure and HR were monitored continuously and recorded at 10-second intervals throughout the procedure. We identified the lowest MAP and highest HR

before and after verapamil injection. The association between IA verapamil and change in MAP and HR was determined using repeated-measures multivariate regression analysis, adjusting for potential confounding factors (weight, preoperative vasopressor use, and preinjection MAP). Data are reported as adjusted coefficients and 95% confidence intervals (CI).

RESULTS: We included 20 subjects who underwent a total of 46 injections of IA verapamil. On the basis of our multivariate model, on average, each 5 mg of IA verapamil was associated with a 3.5 mm Hg reduction in MAP (95% CI −5.0 to −2.0, $P < 0.001$). HR was not significantly altered by IA verapamil on both unadjusted and adjusted analyses (nonsignificant increase of 0.4 beats per minute for each 5 mg of IA verapamil, 95% CI −1.6 to 2.4, $P = 0.70$).

CONCLUSIONS: Under general anesthesia, injection of IA verapamil into cerebral arteries reduces MAP but does not change HR in the average patient. Further research is required to determine the clinical significance of these results.

## 运动训练减轻大鼠坐骨神经慢性缩窄性损伤后的神经性疼痛和细胞因子表达

**Exercise Training Attenuates Neuropathic Pain and Cytokine Expression After Chronic Constriction Injury of Rat Sciatic Nerve**

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背景：运动对神经性疼痛造成影响的关键机制仍然不是很清楚。我们研究了体育锻炼是否可以调节坐骨神经慢性缩窄性损伤后的功能恢复以及热休克蛋白 72 (Hsp72)、肿瘤坏死因子-α(TNF-α) 和白细胞介素-1β(IL-1β)的表达。

方法：雄性SD大鼠被分为7组，分别为：对照组、假手术组(SO)、进行游泳或踏车运动的假手术组(SOSE或SOTE)、慢性缩窄性损伤组（CCI），
进行游泳或踏车运动的CCI组(CCISE或CCITE)。我们记录了体重、热缩足反射潜伏期和机械刺激缩足阈值，同时还记录了Hsp72、TNF-α和IL-1β在坐骨神经中的表达。

结果：对照组和SO组大鼠的体重比SOSE、SOTE、CCI、CCISE和CCITE组大鼠的体重要重。在慢性缩窄性损伤后的第21天，进行游泳或踏车运动的CCI组大鼠的热缩足反射潜伏期和机械刺激缩足阈值明显比没有运动的CCI组大鼠的要长。在慢性缩窄性损伤后的第21天，CCISE和CCITE组大鼠的坐骨神经的Hsp72表达比CCI组高，而TNF-α或IL-1β 水平比CCI组低。

结论：这些结果表明，渐进式的运动训练可以减轻坐骨神经慢性缩窄性损伤后的周围神经性疼痛，同时减少TNF-α 和 IL-1β 的过度表达，并增加HSP72的表达。

（张怡 译 马皓琳 李士通校）

BACKGROUND: The underlying mechanism of exercise on neuropathic pain is not well understood. We investigated whether physical exercise regulates the functional recovery and heat shock protein 72 (Hsp72), tumor necrosis factor-α (TNF-α), and interlukin-1β (IL-1β) expression after chronic constriction injury (CCI) of the sciatic nerve.

METHODS: Male Sprague–Dawley rats were divided into 7 groups: control, sham operated (SO), SO with swimming or treadmill exercise (SOSE or SOTE), CCI, CCI with swimming or treadmill exercise (CCISE or CCITE). We recorded body weight, thermal withdrawal latency, and mechanical withdrawal threshold as well as Hsp72, TNF-α, and IL-1β expression in sciatic nerve.

RESULTS: The body weights in the control and SO groups were heavier than those in the SOSE, SOTE, CCI, CCISE, and CCITE groups. CCI rats with swimming or treadmill exercise showed significant increase in thermal withdrawal latency and mechanical withdrawal threshold when compared with CCI rats without exercise on day 21 after CCI. Both CCISE and CCITE groups demonstrated greater Hsp72 expression and lower TNF-α or IL-1β level than did the CCI group in sciatic nerve on day 21 after CCI.

CONCLUSIONS: These results suggest that progressive exercise training decreases peripheral neuropathic pain as well as TNF-α and IL-1β overproduction and increases HSP72 expression after CCI of the sciatic nerve.

## 大鼠鞘内注射阿替美唑可增加吗啡的镇痛作用

**Intrathecal Atipamezole Augments the Antinociceptive Effect of Morphine in Rats**

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背景：阿片类镇痛药对治疗慢性疼痛有效，但存在严重不良反应，比如产生耐药性和依赖性。$\alpha_2$肾上腺素激动剂和μ阿片受体激动剂在脊髓镇痛中有协同增强和交叉耐受作用，而$\alpha_2$肾上腺素拮抗剂有引起伤害感受的作用。然而，有文献报道，蛛网膜下腔内给予超低剂量的$\alpha_2$肾上腺素拮抗剂反而能促进阿片类药物的镇痛作用。新的数据提示，功能性μ阿片-$\alpha_2$肾上腺素能受体复合物一说可能有助于解释$\alpha_2$肾上腺素拮抗剂的这一神奇效应。本研究评估了低剂量阿替美唑（一种非选择性$\alpha_2$肾上腺素拮抗剂）对全身性和椎管内注射吗啡的镇痛作用和耐受性的影响。

方法：在雄性S-D大鼠用热板试验、甩尾试验和压痛试验评估镇痛效果。诱导全身性和脊髓阿片耐受4天。研究鞘内和皮下注射阿替美唑对吗啡介导的急性镇痛作用和既有吗啡耐受的影响。

结果：全身性和椎管内注射研究剂量（皮下注射0.03、0.3、3μg/kg或鞘内注射0.1、1、10 ng）的阿替美唑本身并不产生镇痛作用。甩尾试验提示，鞘内联合应用吗啡和1ng阿替美唑在给予试验用药后30分钟可增加急性脊髓吗啡的镇痛作用。此外，甩尾试验还提示鞘内注射10ng阿替美唑在给予试验用药后30分钟可减少之前建立的吗啡耐受。但皮下注射阿替美唑对吗啡的全身镇痛作用无明显影响，也不减少吗啡耐受。

结论：椎管内同时联合应用低剂量阿替美唑，可增强吗啡对未做过试验的大鼠和吗啡耐受大鼠的镇痛作用。μ阿片受体和$\alpha_{2A}$肾上腺素受体形成异二聚体导致的功能上的改变和交互作用可解释这些结果。这也为应激状态下或其他因素（如药物）导致去甲肾上腺素能紧张度增加的患者对阿片类药物反应的变异性和耐药性提供了有趣的解释。

（陈彬彬 翻译， 马皓琳 李士通审校）

BACKGROUND: Opioid analgesics are effective in the treatment of chronic pain, but they have serious adverse effects such as development of tolerance and dependence. Adrenergic $\alpha_2$ agonists and μ-opioid receptor agonists show synergistic potentiation and cross-tolerance in spinal analgesia, whereas $\alpha_2$-adrenergic antagonists have shown pronociceptive effects. However, at ultralow doses, spinal $\alpha_2$-adrenergic antagonists have been reported to paradoxically enhance opioid antinociception. New data have suggested a functional μ-opioid-$\alpha_2$-adrenoceptor complex, which may help in interpreting the paradoxical effect of the $\alpha_2$-adrenergic antagonists. In the present study we assessed the effects of low doses of atipamezole, a nonselective $\alpha_2$-adrenergic antagonist, on both systemic and spinal morphine antinociception and tolerance.

METHODS: Antinociception was assessed in male Sprague-Dawley rats using hotplate, tail-flick, and paw pressure tests. Spinal or systemic opioid tolerance was induced for 4 days. The effects of both intrathecal and subcutaneous atipamezole on acute morphine-induced antinociception and established morphine tolerance were studied.

RESULTS: Systemic or spinal atipamezole itself did not produce antinociception at the doses studied (subcutaneous 0.03, 0.3, 3 μg/kg or intrathecal 0.1, 1, 10 ng). The combined administration of spinal morphine and 1 ng of atipamezole increased the antinociceptive effect of acute spinal morphine 30 minutes after the administration of test drugs in the tail-flick test. Furthermore, 10 ng of intrathecal atipamezole attenuated established morphine tolerance 30 minutes after the administration of test drugs in the tail-flick test. However, subcutaneous atipamezole had no significant effect on systemic morphine antinociception, and it did not attenuate morphine tolerance.

CONCLUSIONS: Spinal coadministration of low doses of atipamezole augmented the antinociceptive effect of morphine in naïve and tolerant rats. Heterodimerization of μ-opioid- and $\alpha_{2A}$-adrenoceptors with consequent changes in function and interaction could explain these results. This also suggests an interesting explanation for the variability in opioid response and tolerance in patients experiencing stress or having an increased noradrenergic tone due to other causes, e.g., drugs.

**XIII因子和氨甲环酸而非重组VIIa因子可以减弱组织型纤溶酶原激活物介导的纤溶亢进**

**Factor XIII and Tranexamic Acid But Not Recombinant Factor VIIa Attenuate Tissue Plasminogen Activator-Induced Hyperfibrinolysis in Human Whole Blood.**

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**背景**：纤溶亢进是一种因为凝血因子和血小板消耗进而出血的病理状况。而XIII因子及凝血酶激活的纤溶抑制物在保护血块被溶解方面扮演的重要角色。我们实验假设XIII因子的浓度、凝血原复合物的浓度、重组凝血因子VIIa及氨甲环酸对纤溶都有一定程度的抑制和血小板有助于抗纤维蛋白溶解作用。

**方法**：采自13名健康志愿者的枸盐酸化全血样本，加入重组组织型纤溶酶原激活物的浓度（最终溶度为 100 ng · $mL^{-1}$）使血液发生纤溶亢进。为了评估纤溶抑制情况，所有试验分别分为FXIII-$A_2B_2$ 试剂组(0.42 U ·$mL^{-1}$)、PCC试剂组 (0.42 U ·$mL^{-1}$)、rFVIIa试剂 组(最终浓度: 1.6 μg · $mL^{-1}$)、TA试剂组 (最终浓度 0.33 mg ·$mL^{-1}$),及生理盐水空白组.。
经过45至60分钟的体外激活实验后
，再用旋转血栓弹性测定法分析凝血功能。此外，通过添加细胞松弛素D以此来检测在无血小板作用时，血凝块的形成情况。

**结果**：由重组组织型纤溶酶原激活物诱发的纤溶组（CLI为45时： 中值为 78%; 72/85.5, 25th/75th 百分数），FXIII 组(90%; 82.5/96, *P* = 0.025), PCC组 (89%; 74/91, *P* = 0.0465), 及TA 组(94%; 92/96, *P* = 0.001) ，而 rFVIIa 组为(79%; 72/86.5, *P* = 1.0)
显然对CLI减少很小；同样CLI为60时， 出现增加的组为FXIII组为 (66%; 33/90.5, *P* = 0.017) 和 TA 组为(90%; 89/92, *P* = 0.001) ， 相对比r-tPA 空白组为(21%; 7/59)。在用细胞松弛素D减弱血小板功能后， 明显增加是TA 为(95%; 89/97.5, *P* = 0.0025) 和PCC 为(84%; 70.5/90, *P* = 0.0305) 而 FXIII 及 rFVIIa 在 CLI45 and CLI60为 (TA: 89%; 84.5/96, *P* = 0.01 ，PCC: 55%; 29.5/60, *P* = 0.0405) ， 相对比r-tPA 空白组为(CLI45: 59%; 40.5/72.5 ，CLI60: 10%; 0/30)

**结论**：在用全血样本血栓弹力测量实验中，仅仅氨甲环酸，纤维蛋白稳定因子（XIII因子）和凝血酶原复合物明显抑制重组组织型纤溶酶原激活物诱发的纤溶亢进活动，而rFVIIa则没有此作用。同样，我们发现外源的FXIII 起作用需要依靠有功能的血小板参与

(邓利兵译 薛张纲校)

**BACKGROUND:** Hyperfibrinolysis is a pathological state that often results in depletion of coagulation factors and platelets and can contribute to bleeding. Factor XIII (FXIII) and thrombin activatable fibrinolysis inhibitor have key roles in protecting clots against fibrinolysis. We tested the hypotheses that FXIII concentrate, prothrombin complex concentrate (PCC), recombinant factor VIIa (rFVIIa), and tranexamic acid (TA) inhibit fibrinolysis to different degrees, and that platelets contribute to antifibrinolysis.

**METHODS:** Hyperfibrinolysis was induced by addition of recombinant tissue plasminogen activator (r-tPA) (final concentration: 100 ng $\cdot mL^{-1}$) to citrated whole blood obtained from 13 healthy volunteers. To assess inhibition of fibrinolysis, we added to the assays FXIII-$A_2B_2$ (0.42 U $\cdot mL^{-1}$), PCC (0.42 U $\cdot mL^{-1}$), rFVIIa (final concentration: 1.6 μg $\cdot mL^{-1}$), TA (final concentration: 0.33 mg $\cdot mL^{-1}$), or saline. Coagulation was analyzed by rotational thromboelastometry (ROTEM® ) using the clot lysis index (CLI) after 45 and 60 minutes in extrinsically activated assays, with (FIBTEM® ) and without (EXTEM® ) inhibition of platelet function by cytochalasin D.

**RESULTS:** After r-tPA–evoked fibrinolysis (CLI45: median 78%; 72/85.5, 25th/75th percentile), FXIII (90%; 82.5/96, *P* = 0.025), PCC (89%; 74/91, *P* = 0.0465), and TA (94%; 92/96, *P* = 0.001) but not rFVIIa (79%; 72/86.5, *P* = 1.0) significantly attenuated the decrease in CLI. Similarly, CLI60 increased only with FXIII (66%; 33/90.5, *P* = 0.017) and TA (90%; 89/92, *P* = 0.001) compared with r-tPA alone (21%; 7/59). After abolition of platelet function by cytochalasin D, only TA (95%; 89/97.5, *P* = 0.0025) and PCC (84%; 70.5/90, *P* = 0.0305) but not FXIII or rFVIIa significantly increased CLI45 and CLI60 (TA: 89%; 84.5/96, *P* = 0.01 and PCC: 55%; 29.5/60, *P* = 0.0405) compared with r-tPA alone (CLI45: 59%; 40.5/72.5 and CLI60: 10%; 0/30).

**CONCLUSION:** In thromboelastometric assays using whole blood, only TA, FXIII, and PCC significantly inhibited r-tPA–evoked hyperfibrinolysis whereas rFVIIa had no effect. We also found that the effects of exogenous FXIII were dependent on the presence of functional platelets.

## 可变性的反应是减少当一异丙酚临床观察是纳入控制:一项模拟研究

**The Variability of Response to Propofol Is Reduced When a Clinical Observation Is Incorporated in the Control: A Simulation Study**

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**背景：**当使用血浆靶控输注异丙酚产生镇静作用时，操作者假设病人个体的药代动力学参数与控制系统相匹配以达到特定的效应室靶浓度，并且特定的靶浓度适用于病人个体的敏感性。这些不准确的级联系统在达到要求的镇静深度中产生了错误，称之为“目标错误”。为了处理这样的问题，我们设计了一个整合了操作者观察反应性缺失来确定病人敏感性的控制系统。我们假设这个控制系统可以减少药代动力学错误的影响和敏感性在系统目标错误的不确定性。

**方法：**实现了一个新颖的控制系统在反应性缺失的可能性中能产生一个缓慢的过渡，为操作者提供更大的分辨度观察这个过渡时间。该系统利用这个过渡时间来推断效应室浓度与反应性缺失相关，并且持续输注需要保持这个浓度。我们针对异丙酚用计算机模拟生成了10,000例药代动力学参数和敏感性随机分布的病人，并比较了我们系统的目标错误与达到相关50%可能反应性缺失的效应室浓度的靶控输注系统。

**结果：**我们的系统表现出−0.75%±8.96%的目标错误，相比之下靶控输注系统是0%±27.6%，在达到特定靶浓度的变异性与靶控输注系统相比减少了3.1倍，P < 0.0001有统计学意义。

**结论：**我们的系统能降低包括操纵系统中操作者在内的生物变异性的影响。这种方法的实用性在临床实践中需要进一步评估。

（方昕译 薛张纲校）

**BACKGROUND:** When using a target-controlled infusion of propofol to produce sedation, the operator assumes that the individual patient's pharmacokinetic parameters match those in the control system so that the specified effect-site target is achieved, and that the specified target is appropriate for the individual patient's sensitivity. These inaccuracies cascade, and this produces error in the desired level of sedation, termed “target error.” To address this issue, we designed a control system that incorporates the operator's observation of loss of responsiveness to determine patient sensitivity. Our hypothesis was that this control system would reduce the impact of pharmacokinetic parameter error and uncertainty in sensitivity on the system's target error.

**METHODS:** A novel control system was implemented that produces a slow transition in the probability of loss of responsiveness, providing the operator with greater resolution to observe the time of this transition. The system uses the time of this transition to infer the effect-site concentration associated with loss of responsiveness, and the infusion sequence necessary to maintain this concentration. We used computer simulation to generate a population of 10,000 patients with randomly distributed pharmacokinetic parameters and sensitivity to propofol, and compared the target error of our system with that of a target-controlled infusion system targeting the effect-site concentration associated with 50% probability of loss of responsiveness.

**RESULTS:** Our system exhibited a target error of −0.75% ± 8.96%, compared with 0% ± 27.6% for target-controlled infusion, reducing the variability in achieving the specified target by a factor of 3.1 compared with target-controlled infusion, which was significant at P < 0.0001.

**CONCLUSIONS:** Our system reduces the impact of biological variability by including the operator in the control loop. The utility of this approach in clinical practice will require further evaluation.

## 肺叶切除术后的急性肾损伤:发病率及围术期高危因素

**Acute kidney injury after lung resection surgery: incidence and perioperative risk factors.**

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**背景**：术后急性肾损伤(AKI)发生在多种手术中，它与围术期患者发病率和死亡率相关。但我们对于肺叶切除术后的AKI发生没有进行充分的研究。在本次研究中，我们确认了术后AKI的发病率、高危因素以及术后AKI与肺叶切除术患者预后的关系。

**方法**：我们自2006年1月至2010年3月在三级监护学术中心对接受肺叶切除的患者进行了回顾性的观察研究。术后AKI的诊断建立在术后72小时急性肾损伤网（AKIN）肌酐标准。我们使用逻辑回归模型来确立围术期因素与术后72小时AKI风险之间的关系。我们还研究了术后AKI与患者预后（包括死亡率、住院天数以及再次插管的需求）间的关系。

**结果**：共1129位患者（其中全肺切除n=71，二叶切除术n=30，一叶切除术n=580，肺段切除术n=35，楔形切除术/肺大疱切除术n=413）包含在最终的分析报告中。患者平均年龄61岁(SD
15)，50%是女性患者，其中67位患者(5.9%）基于AKIN肌酐标准术后72小时诊断为AKI（第一级，n=59；第二级，n=8；第三级，n=0），仅有一名患者需要肾脏替代治疗。多变量分析显示术后AKI与下列因素存在独立关系：高血压（调整比值[OR]2.0，95%可信区间[CI]：1.1—3.8），周围血管疾病（OR 4.4，95% CI：1.8—10），肾小球滤过率（OR
2.2，95% CI：0.69—0.93），术前使用血管紧张素II受体阻滞剂（OR 2.2，95% CI：1.1—4.4），术中使用羟乙基淀粉管理（OR 1.5，95% CI：1.1—
4.4），以及胸腔镜操作（对比开放手术）（OR 0.37，95% CI：0.15—
0.90）。根据AKI的进展程度可引起下列相关结果：再插管率的增加（12% vs
2%，P<0.001），术后机械通气率增加（15% vs
3%，P<0.001），以及住院时间的增加（10天 vs
8天，P<0.001）。两组病人的死亡率没有明显区别（3% vs 1%，P=0.12）。

**结论**：肺叶切除术后AKI的术前危险因素与已知的其他手术相同。围术期的管理看上去似乎影响了肺叶切除术后AKI的发生；特别是使用合成胶体可能会增加AKI的风险，而胸腔镜操作可能可以降低AKI的风险。术后早期AKI与呼吸并发症和住院时间的延长相关。

（郭晨跃译 薛张纲校）

**BACKGROUND:**Postoperative acute kidney injury (AKI) is associated with increased perioperative morbidity and mortality in a variety of surgical settings, but has not been well studied after lung resection surgery. In the present study, we defined the incidence of postoperative AKI, identified risk factors, and clarified the relationship between postoperative AKI and outcome in patients undergoing lung resection surgery.

**METHODS:**A retrospective, observational study of patients who underwent lung resection surgery between January 2006 and March 2010 in a tertiary care academic center was conducted. Postoperative AKI was diagnosed within 72 hours after surgery based on the Acute Kidney Injury Network creatinine criteria. Logistic regression was used to model the association between perioperative factors and the risk of AKI within 72 hours after surgery. The relationship between postoperative AKI and patient outcome including mortality, days in hospital, and the requirement of reintubation was investigated.

**RESULTS:**A total of 1129 patients (pneumonectomy n = 71, bilobectomy n = 30, lobectomy n = 580, segmentectomy n = 35, wedge resection/bullectomy n = 413) were included in the final analysis. Patients were an average of 61 years (SD 15) and 50% were female. AKI was diagnosed in 67 patients (5.9%) based on Acute Kidney Injury Network criteria (stage 1, n = 59; stage 2, n = 8; and stage 3, n = 0) within 72 hours after surgery, and only 1 patient required renal replacement therapy. Multivariate analysis demonstrated an independent association between postoperative AKI and hypertension (adjusted odds ratio [OR] 2.0, 95% confidence interval [CI]: 1.1-3.8), peripheral vascular disease (OR 4.4, 95% CI: 1.8-10), estimated glomerular filtration rate (OR 0.8, 95% CI: 0.69-0.93), preoperative use of angiotensin II receptor blockers (OR 2.2, 95% CI: 1.1-4.4), intraoperative hydroxyethyl starch administration (OR 1.5, 95% CI: 1.1-2.1), and thoracoscopic (versus open) procedures (OR 0.37, 95% CI: 0.15-0.90). Development of AKI was associated with increased rates of tracheal reintubation (12% vs 2%, P < 0.001), postoperative mechanical ventilation (15% vs 3%, P < 0.001), and prolonged hospital length of stay (10 vs 8 days, P < 0.001). There was no difference in mortality between the 2 groups (3% vs 1%, P = 0.12).

**CONCLUSIONS:**Preoperative risk factors for AKI after lung resection surgery overlap with those established for other surgical procedures. Perioperative management seems to influence the risk of AKI after lung resection; in particular, the use of synthetic colloids may increase the risk, whereas thoracoscopic procedures may decrease the risk of AKI. Early postoperative AKI is associated with respiratory complications and prolonged hospitalization.

## 食管多普勒对儿童肾脏动脉血流速度和血流指数测量

**Transesophageal Doppler measurement of renal arterial blood flow velocities and indices in children.**

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**背景**:
多普勒源性的肾脏血流指数已经被用来评估肾脏病理。然而，经食道超声（TEE）还没有被用来评估儿科患者的肾变量。在这项研究中，我们（a）评估是否经食道超声（TEE）能使肾实质和肾动脉足够的可视化，及（b）评估在儿童中经食道超声（TEE）源性的肾血流测量/指数与经典的经腹肾超声(TAU)的一致性。

方法：前瞻性队列研究纳入28例1岁和17岁之间的健康儿童，没有已知的肾功能不全，他们正在心导管实验室进行房间隔缺损设备封堵。TEE是用来获取多普勒肾动脉血流速度（收缩期峰值流速，舒张末流速，平均舒张速度，阻力指数，搏动指数），同时这些测量用来与经腹肾超声(TAU)获得的测量进行比较。一致性相关系数（CCC）用来确定两种方法临床上的显著一致性。布兰德 -
奥特曼曲线被用来确定是否同意这两种方法是否具有充分互换使用性。P≤0.05被认为具有统计学意义。

结果：在儿童中通过TEE获得肾实质二维图像和多普勒源性的测量是可行的。对于所有测量来说两种方法具有统计学意义的一致性。两种图像技术的一致性相关系数（CCC）对于搏动指数是0.91，对于阻力指数为0.66。这些系数对于异常值是敏感的。当把最高和最低的数据点从分析中删除，两种图像技术的一致性相关系数（CCC）对于搏动指数是0.62，对于阻力指数为0.50。搏动指数（CI）的95%可信区间为0.35至0.98，阻力指数的为0.21至0.89。布兰德 -
奥特曼曲线表明2种方法之间具有很好的一致性；对于搏动指数，一致性的范围为-0.80到0.53。两种方法在测量大小与平均差之间(-0.14; 95% CI = -0.28, 0.01)的相关性上没有统计学差异(r = 0.31, P = 0.17)。阻力指数，一致性的限制分别为-0.22至0.12。测量大小与方法的平均差异的相关性上没有统计学差异(r = 0.10, P = 0.65)。

结论：这项研究证实了在儿童中用TEE获取肾实质二维图像和多普勒源性测量的可行性。角度独立食道多普勒衍生指数同TAU获得的数据比较具有显著的一致性。评估这种相关性是否持有肾脏病理存在的真实性上需要进一步的研究。这种技术对于根据肾变量的影响而帮助调节术中干预是有潜力的，并可能证明在围术期儿童急性肾损伤的风险评估上是有用的。

(李丽红译 薛张纲校)

**BACKGROUND**: Doppler-derived renal blood flow indices have been used to assess renal pathologies. However, transesophageal ultrasonography (TEE) has not been previously used to assess these renal variables in pediatric patients. In this study, we (a) assessed whether TEE allows adequate visualization of the renal parenchyma and renal artery, and (b) evaluated the concordance of TEE Doppler-derived renal blood flow measurements/indices compared with a standard transabdominal renal ultrasound (TAU) in children.

**METHODS**: This prospective cohort study enrolled 28 healthy children between the ages of 1 and 17 years without known renal dysfunction who were undergoing atrial septal defect device closure in the cardiac catheterization laboratory. TEE was used to obtain Doppler renal artery blood velocities (peak systolic velocity, end-diastolic velocity, mean diastolic velocity, resistive index, and pulsatility index), and these values were compared with measurements obtained by TAU. Concordance correlation coefficient (CCC) was used to determine clinically significant agreement between the 2 methods. The Bland-Altman plots were used to determine whether these 2 methods agree sufficiently to be used interchangeably. Statistical significance was accepted at $P \leq 0.05$.

**RESULTS**: Obtaining 2-dimensional images of kidney parenchyma and Doppler-derived measurements using TEE in children is feasible. There was statistically significant agreement between the 2 methods for all measurements. The CCC between the 2 imaging techniques was

0.91 for the pulsatility index and 0.66 for the resistive index. These coefficients were sensitive to outliers. When the highest and lowest data points were removed from the analysis, the CCC between the 2 imaging techniques was 0.62 for the pulsatility index and 0.50 for the resistive index. The 95% confidence interval (CI) for pulsatility index was 0.35 to 0.98 and for resistive index was 0.21 to 0.89. The Bland-Altman plots indicate good agreement between the 2 methods; for the pulsatility index, the limits of agreement were -0.80 to 0.53. The correlation of the size of the measurement and the mean difference in methods (-0.14; 95% CI = -0.28, 0.01) was not statistically significant (r = 0.31, P = 0.17). For the resistive index, the limits of agreement were -0.22 to 0.12. The correlation of the size of the measurement and the mean difference in methods (-0.05; 95% CI = -0.09, -0.01) was not statistically significant (r = 0.10, P = 0.65).

**CONCLUSION**: This study confirms the feasibility of obtaining 2-dimensional images of kidney parenchyma and Doppler-derived measurements using TEE in children. Angle-independent TEE Doppler-derived indices show significant concordance with those derived by TAU. Further studies are required to assess whether this correlation holds true in the presence of renal pathology. This technique has the potential to help modulate intraoperative interventions based on their impact on renal variables and may prove helpful in the perioperative period for children at risk of acute kidney injury.

## 医学类情报的文章：关于诊断或者术后喉部呼吸的通气

**Medical intelligence article: ventilation of neck breathers undergoing a diagnostic procedure or surgery**

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诊断过程或者手术后予以镇静对于喉部呼吸者包括喉切除病人都是一大挑战。不幸的是，大多数的医疗工作者包括护士，医技人员，外科医生，还有麻醉医生对喉切除患者的术前、术中、术后的解剖并不关心。病人是如何说话，术后如何管理他们的气道。促进这些的方法需要讨论。教育医务人员有关这些组织的解剖能够更好地照顾这类病人。

（孙莉萍译 薛张纲校）

Receiving sedation while undergoing a diagnostic procedure or general anesthesia for surgery is challenging for neck breathers including laryngectomees. Unfortunately, most medical personnel including nurses, medical technicians, surgeons, and anesthesiologists caring for laryngectomees before, during, and after surgery are not familiar with their unique anatomy, how they speak, and how to manage their airways during and after the operation. Methods to improve the care are discussed. Educating medical personnel about these issues can improve the care of neck breathers.

# 控制术后疼痛的新方法：在大鼠术后疼痛模型上植入长效镇痛凝胶

**Novel strategy for the control of postoperative pain: long-lasting effect of an implanted analgesic hydrogel in a rat model of postoperative pain.**

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**背景**：非甾体类抗炎药是目前最常用于术后镇痛的非阿片类药物。本实验中我们检测了大鼠术后疼痛模型上植入可降解水凝胶释放的酮洛芬的持续镇痛效果。

**方法**：将一块镇痛药浸润的水凝胶在手术结束时植入大鼠的跖肌下。用冯弗雷纤维测试术前和术后两周机械刺激的缩足反射阈值。酮洛芬的术后镇痛效果以免疫组化结果评估，通过免疫组化检测脊髓内神经胶质细胞激活及OX-42和磷酸化p38MAPK表达。

**结果**：术后一周，植入酮洛芬浸润的水凝胶组表现出持续镇痛作用。另一种用于超前镇痛的非甾体类抗炎药扎托洛芬，与酮洛芬浸润的水凝胶发挥协同作用，表现出更强的镇痛效果。术后第三天，植入酮洛芬水凝胶组的神经胶质细胞激活减弱。

**结论**：酮洛芬在大鼠术后疼痛模型上一周内降低机械刺激高敏反应是有效的。植入非甾体类抗炎药浸润的水凝胶可作为术后长期镇痛的一种有效方法。

（郁玲玲译 薛张纲校）

**BACKGROUND:** The administration of nonsteroidal anti-inflammatory drugs (NSAIDs) is the most common nonopioid analgesic currently used for postoperative pain management. We tested the sustained analgesic effect of ketoprofen emanating from a biodegradable gelatin hydrogel in a rat model of postoperative pain.

**METHODS:** A sheet of analgesic-infiltrated hydrogel was inserted below the plantaris muscle at the end of surgery. Mechanical thresholds were measured by use of von Frey filaments before and 2 weeks after the operation. The effect of ketoprofen on the postoperative pain was also assessed immunohistochemically by assessing microglial activation in the spinal cord with anti-OX-42 and phosphorylated p38 mitogen-activated protein kinase antibodies.

**RESULTS:** Implantation of ketoprofen-infiltrated gelatin hydrogel exerted a sustained analgesic effect for 1 week after the operation. Preemptive analgesia with zaltoprofen, another NSAID, produced an additive analgesic effect in conjunction with the ketoprofen-infiltrated hydrogel. Microglial activation was attenuated by the treatment with ketoprofen-infiltrated hydrogel on day 3 after the incision.

**CONCLUSIONS:** These results demonstrate that ketoprofen was effective in reducing mechanical hypersensitivity for 1 week in a rat model of postoperative pain and that the implantation of NSAID-infiltrated gelatin hydrogel may serve as a useful analgesic method for the long-term relief of patients after surgery.

# 减少外周神经阻滞中局部麻醉药的钠含量：生理盐水和5%葡萄糖的比较评价——一项随机双盲对照试验

**Reduction in Sodium Content of Local Anesthetics for Peripheral Nerve Blocks: A Comparative Evaluation of Saline with 5% Dextrose—A Randomized Controlled Double-Blind Study**

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**背景：**目前市售的局部麻醉药是用生理盐水稀释而制成，具有较高的钠含量。已有研究暗示，神经周围的钠浓度高时，能通过阻止和/或延缓神经阻滞从而拮抗局部麻醉剂的镇痛效果。目前还没有相关报道称5%葡萄糖注射在神经组织周围时会造成任何短期或长期的伤害。在这项研究中，我们前瞻性地比较和评估了用这两种溶剂稀释局麻药时的阻滞特性。

**方法：**准备行上肢手术的患者随机分组，用0.5%罗哌卡因（1%罗哌卡因用5%葡萄糖或生理盐水进行稀释）行腋路臂丛神经阻滞。每5分钟行运动和感觉阻滞的测试，共进行30分钟。术后24小时和7天进行电话随访，术后3天、10天和/或14天至28天外科随访时记录副作用、病人的满意度、阻滞消失的时间。有任何神经损伤时则随访至消失。主要结果是感觉神经阻滞的起效时间。

**结果：**这项研究共招募了五百五十例患者。葡萄糖组的完全感觉阻滞的平均时间为18.3±6.1分钟，生理盐水组为22.5±6.4分钟（P<0.001，95%置信区间的平均差异3.0-5.4分钟）。5例患者发生临床上的神经损伤（组间无统计学差异）。

**结论：**用5%葡萄糖稀释的罗哌卡因在腋路臂丛神经阻滞中起效较早。

（周玲译 薛张纲校）

**BACKGROUND:** Commercially available local anesthetic drugs when diluted with normal saline have high sodium content. High perineural sodium concentration has been implicated in antagonizing the analgesic effects of local anesthetics by preventing and/or delaying neural blockade. Five percent dextrose is not known to cause any short- or long-term injury when injected around neural tissue. In this study, we prospectively compared and evaluated block characteristics when local anesthetic drug was diluted with these 2 different agents.

**METHODS:** Patients scheduled for upper limb surgery were randomly assigned to receive axillary brachial plexus block with 0.5% ropivacaine (1% diluted with either 5% dextrose or normal saline). Motor and sensory block were tested every 5 minutes for 30 minutes. Postoperatively, a telephone interview was conducted after 24 hours and 7 days along with

surgical follow-up at days 3, 10, and/or 14 to 28 days to document side effects, patient satisfaction, and time for block resolution. Any nerve deficits were followed until resolution. The primary outcome was time to onset of sensory nerve block.

**RESULTS:** Five hundred fifty patients were recruited for this study. The mean time to complete sensory block was 18.3 ± 6.1 minutes in the dextrose group and 22.5 ± 6.4 minutes in the saline group ($P < 0.001$, 95% confidence interval for mean difference 3.0-5.4 minutes). There were 5 patients with clinical nerve deficits (no statistical difference between groups).

**CONCLUSIONS:** Dilution with 5% dextrose provides earlier onset of axillary brachial plexus block with ropivacaine.