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腹横肌平面阻滞用于腹腔镜胆囊切除日间手术术后的有效性：一项随机临床研究

The Beneficial Effect of Transversus Abdominis Plane Block After Laparoscopic Cholecystectomy in Day-Case Surgery: A Randomized Clinical Trial

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背景：腹腔镜胆囊切除术的术后早期常伴有中度疼痛。最近随机试验显示腹横肌平面（TAP）阻滞对腹部手术术后镇痛的有效性。本研究假设腹横肌平面阻滞可以减轻腹腔镜胆囊切除日间手术病人术后24小时内咳嗽及静息时的疼痛，阿片类镇痛药需要量及其副反应。

方法：此项随机双盲研究中，拟在日间手术室接受腹腔镜胆囊切除术的80名患者随机分为两组：术后行超声引导下双侧腹横肌平面（TAP）阻滞（注射0.5%罗哌卡因20mL）或行安慰剂注射。术后疼痛治疗包括口服对乙酰氨基酚1000mg共4次，口服布洛芬400mg共

3次，术后0-2小时内静脉注射吗啡和术后2-
24小时内口服酚哌丙酮。主要终点指标为术后咳嗽时疼痛评分，后者通过术后24小时内曲线下面积(AUC/24 h)计算得到。次要终点指标包括静息时疼痛评分(AUC/24
h)，阿片类镇痛药的需要量及副作用。分别在术后0,2,4,6,8和24小时对患者进行评估。对视觉模拟评分（VAS）疼痛（AUC/24
h）指标的组间比较采用配对t检验。对吗啡和酚哌丙酮需要量的不匹配数据采用秩和检验。对分类数据分析采用卡方检验。
结果：主要终点指标结果为：与安慰剂组相比，腹横肌平面(TAP)阻滞极大的减少了咳嗽时VAS疼痛评分(AUC/24 h) (P =
0.04)[TAP组：26mm(标准差13)(加权平均后）；安慰剂组：34（18）（95%可信区间：: 0.5–15
mm）]。两组在静息状态下VAS疼痛评分（AUV/24h）差异无统计学意义。两组的吗啡需要量（术后0-2小时）有显著差异(P < 0.001) [安慰剂组：中位数7.5mg（四分位差为5-10mg）vs TAP组 中位数5mg（四分位差为0-
5mg）]。TAP组随机患者比安慰剂组需要更少吗啡剂量的比值比为P（TAP组<安慰剂组）= 0.26（可信区间为0.15-
0.37），P=0.5代表无统计学意义。在酚哌丙酮总需要量，恶心和镇静程度，呕吐病人数量及昂丹司琼需要量方面，两组间无明显差异。
结论：腹横肌平面阻滞用于腹腔镜胆囊切除术后，减少咳嗽时疼痛及阿片类药物的需要量有一定效果，但其效果有限。
（诸琳婕　译　陈杰　校）
BACKGROUND: Laparoscopic cholecystectomy is associated with postoperative pain of moderate intensity in the early postoperative period. Recent randomized trials have demonstrated the efficacy of transversus abdominis plane (TAP) block in providing postoperative analgesia after abdominal surgery. We hypothesized that a TAP block may reduce pain while coughing and at rest for the first 24 postoperative hours, opioid consumption, and opioid side effects in patients undergoing laparoscopic cholecystectomy in day-case surgery.
METHODS: In this randomized, double-blind study, 80 patients undergoing laparoscopic cholecystectomy in our day-case surgery unit were allocated to receive either bilateral ultrasound-guided posterior TAP blocks (20 mL 0.5% ropivacaine) or placebo blocks. Postoperative pain treatment consisted of oral acetaminophen 1000 mg × 4, oral ibuprofen 400 mg × 3, IV morphine (0–2 hours postoperatively), and oral ketobemidone (2–24 hours postoperatively). The primary outcome was postoperative pain scores while coughing calculated as area under the curve for the first 24 postoperative hours (AUC/24 h). Secondary outcomes were pain scores at rest (AUC/24 h), opioid consumption, and side effects. Patients were assessed 0, 2, 4, 6, 8, and 24 hours postoperatively. Group-wise comparisons of visual analog scale (VAS) pain (AUC/24 h) were performed with the 2-sample t test. Morphine and ketobemidone consumption were compared with the Mann-Whitney test for unpaired data. Categorical data were analyzed using the $\chi 2$ test.
RESULTS: The primary outcome variable, VAS pain scores while coughing (AUC/24 h), was significantly reduced in the TAP versus the placebo group (P = 0.04); group TAP: 26 mm (SD 13) (weighted average level) versus group placebo: 34 (18) (95% confidence interval): 0.5–15 mm). VAS pain scores at rest (AUC/24 h) showed no significant difference between groups. Median morphine consumption (0–2 hours postoperatively) was 7.5 mg (interquartile range: 5–

10 mg) in the placebo group compared with 5 mg (interquartile range: 0–5 mg) in the TAP group ($P < 0.001$). The odds ratio of a random patient in group TAP having less morphine consumption than a random patient in group placebo was P (group TAP < group placebo) = 0.26 (confidence interval: 0.15, 0.37) where 0.5 represents no difference between groups. There were no between-group differences in total ketobemidone consumption, levels of nausea and sedation, number of patients vomiting, or consumption of ondansetron.
CONCLUSIONS: TAP block after laparoscopic cholecystectomy may have some beneficial effect in reducing pain while coughing and on opioid requirements, but this effect is probably rather small.

一项关于舌下给予芬太尼膜片剂在健康志愿者体内的药代动力学和生物利用度的临床I期研究

A Phase I Pharmacokinetic and Bioavailability Study of a Sublingual Fentanyl Wafer in Healthy Volunteers

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Anesth Analg September 2012 115:554-559

背景：舌下给予阿片类药物是一种快速镇痛的简单无创方法，本I期临床研究调查一种芬太尼膜片剂在健康志愿者体内的药代动力学和生物利用度参数。目的是调查一种新的舌下给予型芬太尼膜片剂的药代动力学特征并确定其绝对生物利用度。
方法：共24名健康志愿者，平均年龄23岁，随机分组接受舌下或静脉给予芬太尼100ug。在芬太尼给药24个小时后，采集血标本并放于无菌聚丙烯试管中。药代动力学参数取决于对芬太尼血浆浓度—时间关系的模型非依赖性药代动力学分析。
结果：舌下给予芬太尼膜片剂的平均绝对生物利用度是78.9%（90%可信区间51.1%—121.7%）。所有志愿者芬太尼血浆浓度首次可测时间的区间为2-10分钟，平均血浆浓度达峰时间是给药后的0.91（±0.73）小时。
结论：舌下给予芬太尼膜片剂可迅速检测出芬太尼血浆浓度。78.9%的绝对生物利用度表明芬太尼很高的系统可利用性，证实了此种膜片剂型有长远发展前景。
（詹凯诞　译　陈杰　校）
BACKGROUND: The sublingual administration of opioids is a simple and noninvasive method that provides rapid analgesia. In this phase I study we investigated the pharmacokinetics and bioavailability of a fentanyl wafer in healthy volunteers. The principal study objective was to investigate the pharmacokinetic profile of a new sublingual fentanyl wafer and to establish its absolute bioavailability.
METHODS: Twenty-four healthy volunteers, mean age 23 years, were randomly assigned to receive the equivalent of fentanyl 100 μg by both the sublingual and IV routes. Blood samples were collected in sterile polypropylene tubes for 24 hours after each fentanyl administration. The

pharmacokinetic parameters were determined by model-independent pharmacokinetic analyses of the plasma fentanyl concentration–time profiles.
RESULTS: The mean absolute bioavailability of the sublingual fentanyl wafer was 78.9% (90% confidence interval [CI] 51.1% to 121.7%). The first detectable plasma fentanyl concentration time ranged from 2 to 10 minutes in all volunteers, and the mean (±SD) time to peak plasma concentration at 0.91 (±0.73) hours after administration.
CONCLUSION: Sublingual administration of fentanyl as a wafer product resulted in rapidly detectable plasma fentanyl concentrations. The absolute bioavailability of 78.9% indicated a high systemic availability of fentanyl and suggests that further development of this wafer is justified.

对于脱机困难的气管插管患者的双模式撤机策略：一项可行性研究

Dual-Mode Weaning Strategy for Difficult-Weaning Tracheotomy Patients: A Feasibility Study

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Anesth Analg September 2012 115:597-604

背景：脱机困难的气管切开患者占用大量ICU资源。这些患者通常会接受漫长的机械通气同样有很高的死亡率。双模式撤机策略（有创和无创机械通气交替）对脱机困难的气管切开病人的疗效是未知的。
方法：于2009年7月至2011年10月，在一个17张床位的呼吸科ICU进行此项前瞻随机对照试验。气管切开后，连续三天自主呼吸试验失败的患者（人数=32），随机分配到双模式组（人数=15）或传统撤机组（人数=17）。
结果：在整个研究过程中及随机化后，双模式组患者较传统撤机组机械通气时间更少（分别为-中位数38天，四分位间距[IQR]：28-53 vs 59，IQR：39-88，P值=0.03;
中位数10天，IQR: 4–21 vs 37, IQR: 16–51, P值<
0.01）。双模式组患者ICU停留时间更短(中位数44天, IQR: 32–54 vs 72, IQR: 52–102, P值 = 0.01)，脱机时死亡率更低(1/15 vs 7/17 , P值 = 0.04),
且在随机化后拥有较低的肺部感染率 (3/15 vs 12/17, P值< 0.01).
结论：双模式撤机对治疗脱机困难的气管切开患者是个有效的策略。本项小样本队列研究证明双模式撤机减少了气管切开患者的机械通气时间和ICU停留时间，建议进一步研究以评估其对肺部感染和死亡率的影响。
（孙莉荔　译　陈杰　校）
BACKGROUND: Tracheotomy patients who are difficult to wean from ventilation consume a substantial portion of intensive care unit (ICU) resources. These patients also typically undergo a long period of mechanical ventilation (MV) and have a high mortality rate. The efficacy of a dual-mode weaning strategy (alternation of invasive and noninvasive MV) in tracheotomy patients who are difficult to wean is unknown.
METHODS: We performed this prospective, randomized, controlled trial in a 17-bed respiratory ICU from July 2009 to October 2011. After tracheotomy, patients who failed for 3 consecutive days in a spontaneous breathing trial were enrolled (n = 32) and randomly allocated to either the dual-mode (n = 15) or conventional (n = 17) weaning group.

RESULTS: Compared with the conventional group, patients in the dual-mode group had a shorter duration of MV during the entire study (median 38 days, interquartile range [IQR]: 28–53 vs 59, IQR: 39–88, P = 0.03) and after randomization (median 10 days, IQR: 4–21 vs 37, IQR: 16–51, P < 0.01). They also had a shorter ICU stay (median 44 days, IQR: 32–54 vs 72, IQR: 52–102, P = 0.01), a lower mortality rate during weaning (1 of 15 vs 7 of 17, P = 0.04), and a lower rate of pulmonary infection after randomization (3 of 15 vs 12 of 17, P < 0.01).
CONCLUSIONS: Dual-mode weaning is a promising strategy for treating tracheotomy patients who are difficult to wean. In a small cohort of patients with tracheotomies, we demonstrated that dual-mode weaning reduced the total duration of MV and ICU stay; we recommend additional studies to assess its effect on pulmonary infections and mortality.

中心静脉乳酸与动脉乳酸是否相同？一项人体回顾性研究

Are Central Venous Lactate and Arterial Lactate Interchangeable? A Human Retrospective Study

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背景：危重病人的动脉血乳酸浓度(Lacta)和Lacta清除率可用于诊断休克，评估预后及指导治疗。近年来，代表混合静脉血氧饱和度的中心静脉血氧饱和度(Scvo2)，可通过中心静脉纤维导管或从中心静脉采血测得，被用于评估休克病人的整体氧供需平衡。当抽取中心静脉血测量Scvo2时，可同时检测中心静脉血乳酸浓度(Lactcv)。此项研究分别评估危重病人的Lactcv和Lactcv清除率对于预测Lacta和Lacta清除率的作用。
方法：此项回顾性研究在一所地区和教学医院的重症监护室进行，通过查询从2007年3月到2009年12月血气分析仪中的电子记录，确定发生循环衰竭及呼吸衰竭患者，且其血气标本的Lactcv和Lacta的检测间隔小于30min。为了评估Lactcv在Lacta分别大于2和4 mmol/L时是否可作为其预测值，计算这两个阈值的ROC曲线下面积(AUCs)。同时计算Lactcv清除率的AUCs来辨别Lacta 清除率<10%或>10%。
结果：分析188例病人共673组Lactcv/Lacta。预测Lacta大于2和4mmol/L的Lactcv AUC分别是0.98(95%可信区间: 0.97–0.99)和0.98(95%可信区间: 0.96–0.99)。Lactcv以2 mmol/L为截断值，对于预测Lacta大于2 mmol/L的敏感度>92%，特异度>90%。判断Lacta清除率<10% 或 >10% 的Lactcv AUC分别为0.93或0.94。
结论：在30分钟内测得的Lactcv和Lacta在临床操作中是等同的。
（瞿亦枫　译　陈杰　校）

BACKGROUND: In critically ill patients, arterial blood lactate concentration (Lacta) and Lacta clearance are used for the diagnosis of shock, for prognosis assessment, and to guide therapy. In recent years, central venous oxygen saturation (Scvo2), a surrogate for mixed venous blood saturation, either measured by fiberoptic catheters or from central venous blood samples, was used in shock to estimate the global balance between oxygen delivery and consumption. When central venous blood is drawn for Scvo2 measurement, it also could be used to measure central venous lactate concentration (Lactcv). In this study, we evaluated the utility of Lactcv and Lactcv clearance as predictors of Lacta and Lacta clearance, respectively, in critically ill patients.

METHODS: This retrospective study was performed in an intensive care unit of a regional and teaching hospital. Using the electronic registry of our blood gas analyzer from March 2007 to December 2009, we identified patients with circulatory or respiratory failure who had pairs of Lactcv and Lacta obtained within a 30-minute interval. To assess the utility of Lactcv as a predictor of Lacta above 2 and 4 mmol/L, we calculated the area under receiver operating characteristic curves (AUCs) for these thresholds. We also calculated AUC of Lactcv clearance to detect a Lacta clearance <10% or >10%.
RESULTS: Six hundred seventy-three Lactcv/Lacta pairs in 188 patients were analyzed. AUC of Lactcv to predict a Lacta above 2 and 4 mmol/L was 0.98 (95% confidence interval: 0.97–0.99) and 0.98 (95% confidence interval: 0.96–0.99), respectively. Lactcv with the cutoff value of 2 mmol/L can predict a Lacta above 2 mmol/L with sensitivity >92% and specificity >90%. AUC for Lactcv clearance to detect a Lacta clearance <10% or >10% was 0.93 or 0.94, respectively.
CONCLUSION: Lactcv and Lacta collected within a 30-minute range are interchangeable for clinical practice.

综述：新生儿和婴儿椎管内镇痛：关于建立安全和有效性数据的临床及临床前期策略回顾

Review Article: Neuraxial Analgesia in Neonates and Infants: A Review of Clinical and Preclinical Strategies for the Development of Safety and Efficacy Data

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作用于椎管内的药物可以提供稳定的镇痛效果，能改善预后，并且是儿童围术期监护的重要组成部分。围术期硬膜外输注阿片类药物或可乐定可增强镇痛。在单次注射局麻药物的骶管麻醉中，加入可乐定，氯胺酮，新斯的明或曲马多可显著延长镇痛效果。且新生儿鞘内麻醉/镇痛在某些中心逐渐增多。但由于缺乏有关镇痛需求、副作用和随访的详实数据，很难确定不同技术和药物的相对风险/收益。总结了当前关于新生儿和婴儿的椎管内麻醉/镇痛的收益和并发症，但目前椎管内用药的多样性反映此领域高质量证据的缺乏。最近临床前期研究报道了全麻药对大脑的发育有不良影响，这个发现使椎管内麻醉/镇痛能避免或减少全麻药用量的优点得到重视。发育中的脊髓同样对药物剂量相关毒性作用较敏感，尽管临床前期实验已用成熟的模型和相关指标来评估期对成年动物脊髓毒性，但是对于幼年生命来说还没有系统性的评估。因此，此综述第二部分列出不同椎管内镇痛药的年龄相关性的药效变化，以及现今基于特定模型的脊髓毒性评估研究。最后因其注射安全范围广，本文提倡使用椎管内麻醉，并建议新的镇痛药和制剂在纳入临床实践之前，采用临床前期实验评估的最小剂量标准。
（王苑　译　陈杰　校）
Neuraxial drugs provide robust pain control, have the potential to improve outcomes, and are an important component of the perioperative care of children. Opioids or clonidine improves analgesia when added to perioperative epidural infusions; analgesia is significantly prolonged by the addition of clonidine, ketamine, neostigmine, or tramadol to single-shot caudal injections of

local anesthetic; and neonatal intrathecal anesthesia/analgesia is increasing in some centers. However, it is difficult to determine the relative risk-benefit of different techniques and drugs without detailed and sensitive data related to analgesia requirements, side effects, and follow-up. Current data related to benefits and complications in neonates and infants are summarized, but variability in current neuraxial drug use reflects the relative lack of high-quality evidence. Recent preclinical reports of adverse effects of general anesthetics on the developing brain have increased awareness of the potential benefit of neuraxial anesthesia/analgesia to avoid or reduce general anesthetic dose requirements. However, the developing spinal cord is also vulnerable to drug-related toxicity, and although there are well-established preclinical models and criteria for assessing spinal cord toxicity in adult animals, until recently there had been no systematic evaluation during early life. Therefore, in the second half of this review, we present preclinical data evaluating age-dependent changes in the pharmacodynamic response to different spinal analgesics, and recent studies evaluating spinal toxicity in specific developmental models. Finally, we advocate use of neuraxial drugs with the widest demonstrable safety margin and suggest minimum standards for preclinical evaluation before adoption of new analgesics or preparations into routine clinical practice.

手术室管理工具成功减少了手术室首台手术延迟：来自德国医院证据

Success of Commonly Used Operating Room Management Tools in Reducing Tardiness of First Case of the Day Starts: Evidence from German Hospitals

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背景：德国手术室管理宣称目标之一是通过减少首台手术的工作拖拉来增加手术室的工作效率。本文分析了德国医院由于增加的经济压力而引进的手术室管理工具是否能够帮助成功达到这一目标。手术室管理工具被定义为手术室管理者的任命和手术室管理公文（即手术室宪章）的发展和引进。假设引进这些管理工具的之一或全部能较少首台手术的工作拖拉情况。
方法：在控制了医院的规模和手术室复杂性的前提下，利用来自107家德国麻醉学系的具有代表性的2005例调查数据，使用托比模型来评估手术室管理者或手术室宪章的引进对首台手术的工作拖拉的影响。
结果：引进手术室管理工具至少能减少首台手术七分钟的延迟（平均减少15分钟，95%的可信区间：7-22分钟，$p<0.01$）
结论：首台手术延迟的减少显著体现了德国手术室管理的目标。结果显示手术室管理者的任命或手术室宪章的引进对这一目标是有积极作用的。对于根据当天的手术来作出短期决策，由于它减少了总体手术室使用时间，故这种减少是有经济学意义的。
（郑华容　译　陈杰　校）

BACKGROUND: One of the declared objectives of surgical suite management in Germany is to increase operating room (OR) efficiency by reducing tardiness of first case of the day starts. We analyzed whether the introduction of OR management tools by German hospitals in response to increasing economic pressure was successful in achieving this objective. The OR management tools we considered were the appointment of an OR manager and the development and adoption of a surgical suite governance document (OR charter). We hypothesized that tardiness of first case starts was less in ORs that have adopted one or both of these tools.
METHODS: Using representative 2005 survey data from 107 German anesthesiology departments, we used a Tobit model to estimate the effect of the introduction of an OR manager or OR charter on tardiness of first case starts, while controlling for hospital size and surgical suite complexity.
RESULTS: Adoption reduced tardiness of first case starts by at least 7 minutes (mean reduction 15 minutes, 95% confidence interval (CI): 7–22 minutes, $P < 0.001$).
CONCLUSION: Reductions in tardiness of first case starts figure prominently the objectives of surgical suite management in Germany. Our results suggest that the appointment of an OR manager or the adoption of an OR charter support this objective. For short-term decision making on the day of surgery, this reduction in tardiness may have economic implications, because it reduced overutilized OR time.

术后阿片类药物服用的决定因素的纵向队列研究

A Pilot Cohort Study of the Determinants of Longitudinal Opioid Use After Surgery

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背景：对术后阿片类药物的服用时长的决定因素尚未报道。假设术前心理压力和滥用药物都将延长术后阿片类药物的服用时长。
方法：2007年1至2009.4，一项前瞻性纵向队列研究纳入134例患者，有109例患者完成全程随访。手术类型包括乳房切除术、乳房肿瘤切除、胸廓切开术、全膝关节置换术或全髋关节置换术。术前测试心理压力、了解药物滥用情况，并且记录患者日常阿片类药物服用情况，直至患者报告停药和疼痛停止。研究的主要终点是阿片类药物停用的时刻。所有分析都有相应手术类型的对照组。
结果：总体，6%患者持续服用新的阿片类药物至术后150天。术前服用阿片类药物、抑郁症状、成瘾风险自我评价增加是延长服用阿片类药物的独立因素。术前服用阿片类药物与

73%术后服用时间延长的发生有关（95%置信区间（CI）18 %-58%） (P = 0.0009)。另外，成瘾风险自我评价每增加1分（4分制），服用时间延长的发生增加53%（95% CI 23%-71%）(P = 0.003)。独立于术前阿片类药物服用和成瘾风险自我评价，术前贝克抑郁量表II每增加10分，服用时间延长的发生增加42％（95% CI 18 %-58%）（P = 0.002）。术前服用阿片类药物、成瘾风险自我评价和抑郁症状，较术后疼痛持续时间或严重程度，更能预测术后阿片类药物使用时长的变化。

结论：术前因素，包括合法医嘱的阿片类药物服用，成瘾风险自我评价，抑郁状态都是预测术后阿片类药物延长服用的独立因素。比起术后疼痛时间或严重程度，这些因素均能更好预测延长阿片类药物的服用。

（黄萍　译　陈杰　校）

BACKGROUND: Determinants of the duration of opioid use after surgery have not been reported. We hypothesized that both preoperative psychological distress and substance abuse would predict more prolonged opioid use after surgery.

METHODS: Between January 2007 and April 2009, a prospective, longitudinal inception cohort study enrolled 109 of 134 consecutively approached patients undergoing mastectomy, lumpectomy, thoracotomy, total knee replacement, or total hip replacement. We measured preoperative psychological distress and substance use, and then measured the daily use of opioids until patients reported the cessation of both opioid consumption and pain. The primary end point was time to opioid cessation. All analyses were controlled for the type of surgery done.

RESULTS: Overall, 6% of patients continued on new opioids 150 days after surgery. Preoperative prescribed opioid use, depressive symptoms, and increased self-perceived risk of addiction were each independently associated with more prolonged opioid use. Preoperative prescribed opioid use was associated with a 73% (95% confidence interval [CI] 0.51%–87%) reduction in the rate of opioid cessation after surgery (P = 0.0009). Additionally, each 1-point increase (on a 4-point scale) of self-perceived risk of addiction was associated with a 53% (95% CI 23%–71%) reduction in the rate of opioid cessation (P = 0.003). Independent of preoperative opioid use and self-perceived risk of addiction, each 10-point increase on a preoperative Beck Depression Inventory II was associated with a 42% (95% CI 18%–58%) reduction in the rate of opioid cessation (P = 0.002). The variance in the duration of postoperative opioid use was better predicted by preoperative prescribed opioid use, self-perceived risk of addiction, and depressive symptoms than postoperative pain duration or severity.

CONCLUSIONS: Preoperative factors, including legitimate prescribed opioid use, self-perceived risk of addiction, and depressive symptoms each independently predicted more prolonged opioid use after surgery. Each of these factors was a better predictor of prolonged opioid use than postoperative pain duration or severity.

在连续股神经阻滞中，导管尖端相对于股神经位置（前或后）对股四头肌运动和皮肤感觉阻滞效果的影响

Continuous Femoral Nerve Blocks: The Impact of Catheter Tip Location Relative to the Femoral Nerve (Anterior Versus Posterior) on Quadriceps Weakness and Cutaneous Sensory Block

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背景:连续股神经阻滞过程中，导管尖端相对于股神经的不同放置，其对输注特点的影响仍然未知。
方法:分别将两根导管置于志愿者双侧股神经周围（B超引导下平面内进针）。如在患者优势侧将导管尖端随机置于股神经的前方或后方。则在对侧肢体将导管尖端放置到另一侧。通过两个导管同时输注0.1%的罗哌卡因持续6个小时（4ml/h）。测量的指标包括股四头肌的最大随意等长收缩（MVIC）和股四头肌腱远端的经皮电流耐受程度。分别在0小时（基线值），第9小时，还有第22小时进行测量。研究的主要终点是股四头肌在6个小时候的MVIC值。
结果：在第6
个小时或者其他时间段，导管尖端放置在股神经前、后的两组（n=16）的股四头肌MVIC值并没有显著的统计学差异(均数 [标准差] 分别为29% [26] vs 30% [28]; 95% 可信区间: −22% 至 20%; P = 0.931)。不但在第6小时(分别为20 [23] mA vs 6 [4] mA; 95% 可信区间: 1–27 mA; P = 0.035)，同样在第1、7、8、9小时 (P <
0.04)前端组较后侧组对表层电流的最大耐受度要更高。
结论：此研究证实通过放置在股神经前面和后面的神经导管，注射低剂量的罗哌卡因（4 mg/h）进行持续的股神经阻滞，都产生明显股四头肌的肌力下降(70%–
80%)。与导管放置在后面组相比，导管放置在前面组增加了感觉神经的阻滞，而不伴相应的运动神经阻滞。
（马霄雯　译　陈杰　校）
BACKGROUND: During a continuous femoral nerve block, the influence of catheter tip position relative to the femoral nerve on infusion characteristics remains unknown.
METHODS: We inserted bilateral femoral perineural catheters in volunteers (ultrasound-guided, needle in-plane). Subjects' dominant side was randomized to have the catheter tip placed either anterior or posterior to the femoral nerve. The contralateral limb received the alternative position. Ropivacaine 0.1% was administered through both catheters concurrently for 6 hours (4 mL/h). Outcome measures included the maximum voluntary isometric contraction (MVIC) of the quadriceps femoris muscle and tolerance to cutaneous electrical current over to the distal quadriceps tendon. Measurements were performed at hour 0 (baseline), and on the hour until hour 9, as well as hour 22. The primary end point was the MVIC of the quadriceps at hour 6.
RESULTS: As a percentage of the baseline measurement, quadriceps MVIC for limbs with anterior (n = 16) and posterior (n = 16) catheter tip placement did not differ to a statistically significant degree at hour 6 (mean [SD] 29% [26] vs 30% [28], respectively; 95% confidence interval: −22% to 20%; P = 0.931), or at any other time point. However, the maximum tolerance to cutaneous electrical current was higher in limbs with anterior compared with posterior catheter tip placement at hour 6 (20 [23] mA vs 6 [4] mA, respectively; 95% confidence interval: 1–27 mA; P = 0.035), as well as at hours 1, 7, 8, and 9 (P < 0.04).
CONCLUSIONS: This study documents the significant (70%–80%) quadriceps femoris weakness induced by a continuous femoral nerve block infusion at a relatively low dose of ropivacaine (4 mg/h) delivered through a perineural catheter located both anterior and posterior

to the femoral nerve. In contrast, an anterior placement increases cutaneous sensory block compared with a posterior insertion, without a concurrent relative increase in motor block.

关于右旋氯胺酮对健康志愿者和复杂性区域疼痛综合症1型慢性疼痛患者心输出量的剂量依赖效应

The Dose-Dependent Effect of S(+)-Ketamine on Cardiac Output in Healthy Volunteers and Complex Regional Pain Syndrome Type 1 Chronic Pain Patients

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背景：氯胺酮作为镇痛剂用于急性和慢性疼痛的治疗。氯胺酮对心血管系统有刺激作用，然而对其浓度 - 效应关系知之不多。
为此，我们利用药代动力学及药效学模型来验证了右旋氯胺酮在健康志愿者和慢性疼痛患者对心输出量的影响。
方法：在10例慢性疼痛患者（诊断出患有复杂区域疼痛综合征1型[CRPS1，平均年龄43.2±13岁，病程8.4年，范围为1.1至21.7岁）和12名健康志愿者（21.3±1.6岁），给予首剂1.5 mg的右旋氯胺酮后，以后每次增加近1.5毫克，共7次，每次给药时间超过5min，每次间隔近20分钟通过植入桡动脉的动脉导管的动脉压力曲线计算出心输出量。
并对血浆中氯胺酮和去甲氯胺酮进行浓度测定。构建一个基于药动学，药效学新型模型，用于量化氯胺酮对心输出量的影响及后续适应/抑制效应。
结论：通过药代动力学的评估，相比CRPS1患者，我们在健康志愿者中观察到其增加了15 % 的右旋氯胺酮及增加了
40%去甲氯胺酮。在病人和志愿者中，输注右旋氯胺酮对于CO的刺激作用呈剂量依赖性。在输注后观察到CO
的抑制作用。在CRPS1患者和健康志愿者中，药效学模型参数没有显着差异。引起心输出量增加1L/min的右旋氯胺酮浓度是243 ± 54 ng/mL，消除半衰期是 1.3 ± 0.21
分钟。抑制过程是缓慢的（时间常数为67.2±17.0分钟）。
结论：在研究人群中，不管在疾病状态（CRPS1与否）或年龄的差异，右旋氯胺酮的区别是其药效学而非药代动力学。
右旋氯胺酮对心输出量的的剂量依赖性的效果可通过双相的动态模型做出很好的描述。
（邓利兵译 薛张纲校）

BACKGROUND: Ketamine is used as an analgesic for treatment of acute and chronic pain. While ketamine has a stimulatory effect on the cardiovascular system, little is known about the concentration–effect relationship. We examined the effect of S(+)-ketamine on cardiac output in healthy volunteers and chronic pain patients using a pharmacokinetic–pharmacodynamic modeling approach.
METHODS: In 10 chronic pain patients (diagnosed with complex regional pain syndrome type 1 [CRPS1] with a mean age 43.2 ± 13 years, disease duration 8.4 years, range 1.1 to 21.7 years) and 12 healthy volunteers (21.3 ± 1.6 years), 7 increasing IV doses of S(+)-ketamine were given

over 5 minutes at 20-minute intervals starting with 1.5 mg with 1.5-mg increments. Cardiac output (CO) was calculated from the arterial pressure curve obtained from an arterial catheter in the radial artery. Ketamine and norketamine plasma concentrations were measured. A novel pharmacokinetic–pharmacodynamic model was constructed to quantify the direct stimulatory effect of ketamine on CO and the following adaptation/inhibition.
RESULTS: Significant differences in pharmacokinetic estimates were observed between study groups with 15% and 40% larger S(+)-ketamine S(+)-norketamine concentrations in healthy volunteers compared to CRPS1 patients. S(+)-ketamine had a dose-dependent stimulatory effect on CO in patients and volunteers. After infusion an inhibitory effect on CO was observed. Pharmacodynamic model parameters did not differ between CRPS1 patients and healthy volunteers. The concentration of S(+)-ketamine causing a 1 L/min increase in CO was 243 ± 54 ng/mL with an onset/offset half-life of 1.3 ± 0.21 minutes. The inhibitory component was slow (time constant of 67.2 ± 17.0 minutes).
CONCLUSIONS: S(+)-ketamine pharmacokinetics but not pharmacodynamics differed between study populations, related to differences in disease state (CRPS1 or not) or age. The dose-dependent effect of S(+)-ketamine on CO was well described by the biphasic dynamic model. The effect of S(+)-ketamine on CO was similar between study groups with respect to its stimulatory and inhibitory components, despite group differences in age and health.

两种钠离子通道调节剂对活体猪皮内C类纤维导电性能的不同影响

The Differential Effects of Two Sodium Channel Modulators on the Conductive Properties of C-Fibers in Pig Skin In Vivo

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背景：针对慢性疼痛治疗来说，轴突的钠通道是一个有吸引力的目标，而且最近的证据显示对于特殊的目标，慢性失活的钠通道（NaV）可以发挥镇痛作用。使用类人类动物模型——
猪，我们快速给予利多卡因（非选择性钠通道阻断剂）和拉科酰胺（钠通道慢性失活选择性增强剂）来比较不同C类纤维等级的传导性能的变化。
方法：单纤维细胞外记录从隐神经进行。我们根据机械响应和传导速度的功能性依赖放缓的数量来给C类纤维分类。在刺激的部位皮内注入利多卡因(4 mM; 100
μL)，拉科酰胺(4 mM; 100 μL)或者生理盐水，然后对纤维传导性能的变化进行评估。
结果：被利多卡因诱发的传导延迟在机械敏感的疼痛感应器(5.5%±
2.1%)中比机械迟钝的(2.5% ±
1%)要明显的多。然而使用拉科酰胺的C类疼痛感应器，机械迟钝的(3% ±
1%)比机械敏感的(2% ±
0.9%)增加到了更大的一个程度。利多卡因，而不是拉科酰胺，增加了所有机械敏感的C类纤维的电阈值，而不是机械迟钝的C类纤维。拉科酰胺阻碍了传导，此外，相比较机械

敏感的疼痛感应器(ΔADS: 2.4% ± 0.5% vs 1.6% ± 0.5%)，在机械迟钝的疼痛感应器中功能性依赖放缓要减少的显著的多，利多卡因却恰恰是相反的结果。生理盐水在C类纤维的传导性上没有明显的效果。

结论：在猪皮上的混合测试的局部应用，要考虑到有疼痛反应的和无疼痛反应的C类纤维的稳定性和功能依赖性调整的功能评估。增加的镇痛特异性可能来自钠通道缓慢失活的选择性增强。

(方昕译 薛张纲校)

BACKGROUND: Axonal sodium channels are attractive targets for chronic pain treatment, and recent evidence suggests that specific targeting of the slow inactivation of sodium channels (NaV) might exert analgesic effects. Using a human-like animal model, the pig, we compared changes in the conductive properties of different C-fiber classes on acute administration of lidocaine (nonselective NaV blocker) and lacosamide (selective enhancer of NaV slow inactivation).

METHODS: Single-fiber extracellular recordings from saphenous nerves were performed. We classified C-fibers according to mechanical responsiveness and amount of activity-dependent slowing (ADS) of conduction velocity. Lidocaine (4 mM; 100 μL), lacosamide (4 mM; 100 μL), or saline was injected intradermally at the stimulation site, and changes of fibers' conductive properties were assessed.

RESULTS: Conduction latencies evoked by lidocaine were more prominent in mechanosensitive (5.5%± 2.1%) than in mechano-insensitive nociceptors (2.5% ± 1%), whereas lacosamide increased conduction latencies to a greater extent in the mechano-insensitive (3% ± 1%) than in mechanosensitive C-nociceptors (2% ± 0.9%). Lidocaine, but not lacosamide, increased electrical thresholds in all mechanosensitive, but not in the mechano-insensitive, C-fibers. Lacosamide blocked conduction and, in addition, reduced ADS in mechano-insensitive nociceptors significantly more than in mechanosensitive nociceptors (ΔADS: 2.4% ± 0.5% vs 1.6% ± 0.5%), whereas lidocaine had opposite effects. Saline had no significant effect on the conductive properties of C-fibers.

CONCLUSION: Local application of test compounds in pig skin allows for functional assessment of steady-state and use-dependent modulation of sodium channels in nociceptive and nonnociceptive C-fibers. Increased analgesic specificity might derive from selective enhancement of slow inactivation of sodium channels.

一项关于外科术后血糖控制的新型计算机化记忆褪色算法

A novel computerized fading memory algorithm for glycemic control in postoperative surgical patients.

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背景：高血糖常见于危重病人，并且其与患者发病率和死亡率的增加相关。为了更好的控制血糖水平，我们最近开发了一种新型计算机化记忆褪色（FM）算法。在本项研究中

，我们在外科重症监护室（SICU）患者中评估了这项算法的安全性和有效性，并且将之与在我们机构中使用的现有的胰岛素输注算法（弗吉尼亚（VA）算法）相比较。
方法：我们开发了一项计算机程序来演算FM算法和VA算法。48位择期手术患者被随机分配，接受按照FM算法或是VA算法得出的胰岛素泵输注。在SICU中，胰岛素泵的使用是将手术室中带入的继续输注，或是当患者血糖水平超过目标水平（140mg/dL）时启动胰岛素泵。每小时对患者进行血糖监测并将数据输入计算机程序中，然后得出出下一次的胰岛素剂量。在SICU的第一个8小时使用随机分配两种算法，在这之后统一使用VA算法。低血糖（血糖<60mg/dL）和高血糖（血糖>300mg/dL）事件会予以记录。此外，我们将使血糖回归目标范围（140±20mg/dL）所需的时间、在目标范围内血糖测量的数量、血糖变异性以及胰岛素的使用情况在2种算法间进行了分析和比较。
结果：两组患者在人口统计学和初始血糖值上相似。在使用现有的VA算法下，观察到一起严重的低血糖事件；3位患者的血糖在8小时内没有到达目标范围。FM算法下，没有出现过低血糖事件；所有的患者均在8小时内血糖达到目标范围。血糖变异性测量通过计算平均血糖的标准差得出。变异性为28%（95%可信区间：14%-39%），FM算法较低（P<0.001）。FM算法使用的胰岛素剂量比VA算法少1.1U/h（P=0.043）。
结论：使用新型的计算机化FM算法模拟生理双向胰岛素分泌进行血糖控制，血糖管理优于现有算法，没有任何低血糖发作。FM算法相比常规临床算法减少了血糖变异性以及胰岛素的使用量。
(郭晨跃译 薛张纲校)
BACKGROUND: Hyperglycemia is commonly encountered in critically ill patients and is associated with increased mortality and morbidity. To better control blood glucose levels, we previously developed a new computerized fading memory (FM) algorithm.(1) In this study we evaluated the safety and efficacy of this algorithm in surgical intensive care unit (SICU) patients and compared its performance against the existing insulin-infusion algorithm (named VA algorithm) used in our institution.
METHODS: A computer program was developed to run the FM and VA algorithms. Forty eight patients, who were scheduled to have elective surgery, were randomly assigned to receive insulin infusion on the basis of either the FM or VA algorithm. On SICU admission, an insulin infusion was either continued from the operating room or initiated when the glucose level exceeded the target level of 140 mg/dL. Hourly blood glucose measurements were performed and entered into the computer program, which then prescribed the next insulin dose. The randomly assigned algorithm was applied for the first 8 hours of SICU stay, after which the VA algorithm was used. The number of episodes of hypoglycemia (glucose <60 mg/dL) and excessive hyperglycemia (>300 mg/dL) were noted. Additionally, the time required to bring the glucose level within target range (140 ± 20 mg/dL), the number of glucose measurements within the target range, glycemic variability, and insulin usage were analyzed and compared between the 2 algorithms.
RESULTS: Patient demographics and starting glucose levels were similar between the groups. With the existing VA algorithm, 1 episode of severe hypoglycemia was observed. Three patients did not reach the target range within 8 hours. With the FM algorithm no hypoglycemia occurred, and all patients achieved the target range within 8 hours. Glycemic variability measured by the SD of mean glucose levels was 28% (95% confidence interval, 14% to 39%) lower for the FM algorithm (P < 0.001). The FM algorithm used 1.1 U/h less insulin than did the VA algorithm (P = 0.043).

CONCLUSION: The novel computerized FM algorithm for glycemic control, which emulates physiologic biphasic insulin secretion, managed glucose better than the existing algorithm without any episodes of hypoglycemia. The FM algorithm had less glycemic variability and used less insulin when compared to the conventional clinical algorithm.

对于左心发育不全综合征的双心室修补过渡血液循环的数学模型

A mathematical model of transitional circulation toward biventricular repair in hypoplastic left heart syndrome.

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背景：虽然对于单一心室损伤左心脏发育不全综合征的传统手术方法是执行阶段性，姑息性的手术,但是对于双心室修复病人无论是作为一个主要的或作为一个分阶段的手术过程一定解剖亚型是作为候选的。对于那些单一心室损伤--
左侧心室对于体循环输出没有任何贡献的
、施行传统干预措施的病人能够优化全身组织氧供(DO(2))和静脉氧饱和度的肺循环（Q（P））/体循环（Q（S））血流量比值范围已经被描绘出。然而，在从阶段性修复到两心室修复期间创建的过渡环流，左心室确实对心输出量作出了贡献。系统性的氧供和系统性的静脉氧饱和度被最佳化的Q(P)/Q(S)
，在后者的环流优化尚未评价。利用计算机模型，我们研究了优化全身氧输送参数。
方法：在改良的第一阶段操作和用Sano分流改良的双向Glenn分流后我们设计了模型血液循环，这是从阶段性到双心室修复而创造的过渡性循环。在两个模型中衍生的数理方程用来描述
全身组织氧供。利用计算机和电子表格我们用这些方程去检验全身氧供DO(2)与动脉血氧饱和(Sao(2))度，静脉血氧饱和度(Svo(2))，动脉血氧饱和度与静脉血氧饱和度差值Sao(2) - Svo(2)，肺循环与体循环比值Q(P)/Q(S)，及氧过剩因子Sa o(2)/(Sao(2) - Svo(2))之间的相互关系。
结果：在这两个循环中，Sao(2)或者Svo(2)本身不能准确地预期DO(2) 或Q(P)/Q(S)。这些变量间的相互关系被左心室提供的体循环输出量的程度进一步改变了。相反地，DO（2）与氧过剩因子表现出了与左心室体循环心输出量的程度无关的线性关系。
结论：通常临床使用的评估指标，如单独使用Sao(2)或Svo(2)不能准确地评估DO(2)或Q(P)/Q(S)。因此，这些不能被单独用来指导手术期间的治疗。
(李丽红译 薛张纲校)

BACKGROUND: Although the traditional surgical approach or left hypoplastic heart syndrome is to perform staged, palliative procedures as a single ventricle lesion, certain anatomical subsets of patients are candidates for a 2-ventricle repair either as a primary or as a staged procedure. The pulmonary blood flow (Q(P))/systemic blood flow (Q(S)) range necessary to optimize

systemic oxygen delivery (DO(2)) and systemic venous oxygen saturation has been delineated for patients undergoing conventional interventions as a single ventricle physiology where the left ventricle is assumed to make no contribution to systemic cardiac output. However, in the transitional circulations created during staging to a 2-ventricle repair, the left ventricle does contribute to cardiac output. The Q(P)/Q(S) at which systemic DO(2) and systemic venous oxygen saturation are optimized in the latter circulations has not yet been evaluated. Using computer modeling, we investigated parameters to optimize systemic oxygen delivery.
METHODS: We designed model circulations after both modified stage I operation and modified bidirectional Glenn shunt with Sano shunt, which are transitional circulations created during staging to a 2-ventricle repair. Mathematical equations were derived to describe DO(2) in both models. Using a computer and an Excel spreadsheet, we used the equations to examine the relationships between DO(2) and arterial oxygen saturation (Sao(2)), venous oxygen saturation (Svo(2)), Sao(2) - Svo(2), Q(P)/Q(S), and the oxygen excess factor Sao(2)/(Sao(2) - Svo(2)).
RESULTS: In both circulations, Sao(2) or Svo(2) alone does not accurately predict DO(2) or Q(P)/Q(S). The relationships between these variables are further altered by the degree of systemic cardiac output supplied by the left ventricle. To the contrary, DO(2) demonstrates the linear relationship with the oxygen excess factor Sao(2)/(Sao(2) - Svo(2)) irrespective of the degree of systemic cardiac output supplied by the left ventricle.
CONCLUSIONS: Commonly obtained clinical values such as Sao(2) and Svo(2) alone are not accurate assessments of DO(2) or Q(P)/Q(S). Therefore, these cannot be used in isolation to guide perioperative therapy.

蛰伤经颅大脑皮层激发电位监测的发生率

The Incidence of Bite Injuries Associated with Transcranial Motor-Evoked Potential Monitoring

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背景：蛰伤在经颅大脑皮层激发点位监测中是复杂的干扰。我们试图去确定其发生率，类型和严重的咬伤，分析与经颅大脑皮层激发点位监测可能相关的方面。
方法：我们从17273件相关的外科手术中复习了与经颅大脑皮层相关的蛰伤的事件报告。将事件按咬伤的数量和类型，定位，麻木和刺激变量分类。
结果：在109名病人中有111伤害包括88例舌头损伤，22例唇部损伤和1例门牙损伤。一名病人既损伤了舌头有损伤了唇部；另一名病人损伤了唇部和牙齿。严重的蛰伤包括从轻微的擦伤到需要缝合修补的深撕裂伤。需要修复的严重损伤共有25名患者。有两名患者需要用牙垫。对于不严中的损伤前路修复的方法比后路更普遍。与Xltek Protektor相比在Axon NIM-Eclipse系统中咬伤的发生率更高。刺激强度在77例中最大化。
结论：与蛰伤相关的经颅的点刺激是不寻常的但是经颅大脑皮层激发点位监测复杂的干扰，最严重的是要求缝合的发生率是0.14%。舌头的损伤发生大约是唇部损伤的4倍。除去蛰伤的刺激，改变咬伤的刺激和位置是可能的故障。高强度的经颅刺激可能会增加咬伤的危险。我们提议一直用合适的尺寸的咬伤刺激和定期修复以达到使蛰伤的危险最小化。未来的学习需要选择最理想的刺激结构。

（孙莉萍译 薛张纲校）

BACKGROUND: Bite injuries are a disturbing complication of transcranial motor-evoked potential (TcMEP) monitoring. We sought to determine the incidence, type, and severity of bite injuries, and to analyze possible related factors to determine methods of minimizing injury during TcMEP monitoring.

METHODS: We reviewed the incident reports of TcMEP-associated bite injuries from 17,273 consecutive surgical procedures. Cases were reviewed for type and number of bite blocks, positioning, anesthesia, and stimulus variables.

RESULTS: There were 111 bite injuries in 109 patients for a total incidence of 0.63% including 88 (79.3%) tongue injuries, 22 (19.8%) lip injuries, and 1 (0.9%) broken incisor. One patient had both tongue and lip injured; another had a lip injury and a broken tooth. Severity of bite injuries ranged from minor bruising to deep lacerations requiring suture repair. The total incidence of injury severe enough to require sutures was 25 patients (0.14%). All but 2 patients had some form of bite block used. Anterior approaches were more prevalent than posterior in the injured group although not significantly. The incidence of bite injuries was higher when the Axon NIM-Eclipse system was used (1.37%) compared with the Xltek Protektor (0.6%). Stimulus intensity was maximized in 77 cases (70.6%). In 22 cases, displacement of bite block or of the tongue was documented.

CONCLUSIONS: Bite injuries associated with transcranial electric stimulation are an uncommon but disturbing complication of TcMEP monitoring occurring with an incidence of 0.63% (95% confidence interval: 0.52%-0.76%), the most severe of which requiring sutures at an incidence of 0.14% (95% confidence interval: 0.09%-0.21%). Injuries of the tongue occur approximately 4 times as frequently as injuries of the lip. Despite placement of bite blocks, shifting of the bite block during stimulation or positioning is a possible cause of failure. High-intensity transcranial stimulation may increase the risk of bite injuries. We suggest consistent use of properly sized and secured bite blocks with periodic inspection to minimize risk of bite injuries. Future study is needed to determine optimal bite block configuration.

上肢移植的麻醉处理：匹兹堡经验

Anesthetic Management in Upper Extremity Transplantation: The Pittsburgh Experience

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背景：与实质器官不同，手、前臂、上臂移植是联合血管移植，由皮肤、肌肉、肌腱、血管、神经、淋巴结、骨和骨髓等多种组织构成。在过去的十年中，有26例上肢移植在美国实施。2008年1月至2010年9月间，匹兹堡大学医学中心在5位受体身上完成8例手/前臂移植，具有最多的单中心经验。在上肢移植这新兴邻域中，麻醉实施必须具有相匹配的方

案和程序，有关区域阻滞的作用、移植手术中免疫抑制药物的疗效、在显微手术中液体和血流动力学的管理、严格的术中监测等在长时间的手术过程中需要着重注意。
方法：基于5位患者的麻醉经验，我们首次列出上肢移植手术麻醉的关键点。我们强调减少术中使用血管升压药，加强液体管理和使用血液制品的重要性。
结果：我们的方法降低了因围术期出血需要再次探查或止血的机率，缩短了住院和住重症监护室的时间。所有患者移植物的功能、免疫以及存活率等结果都非常令人鼓舞。
结论：具体麻醉方案的确定和标准化需要进一步的实践。同时，我们提供建议的目地是为了实施这种新手术的中心有相关的准则。
（郁玲玲译 薛张纲校）
BACKGROUND: Hand/forearm/arm transplants are vascularized composite allografts, which, unlike solid organs, are composed of multiple tissues including skin, muscle, tendons, vessels, nerves, lymph nodes, bone, and bone marrow. Over the past decade, 26 upper extremity transplantations were performed in the United States. The University of Pittsburgh Medical Center has the largest single center experience with 8 hand/forearm transplantations performed in 5 recipients between January 2008 and September 2010. Anesthetic management in the emerging field of upper extremity transplants must address protocol and procedure-specific considerations related to the role of regional blocks, effects of immunosuppressive drugs during transplant surgery, fluid and hemodynamic management in the microsurgical setting, and rigorous intraoperative monitoring during these often protracted procedures.
METHODS: For the first time, we outline salient aspects of upper extremity transplant anesthesia based on our experience with 5 patients. We highlight the importance of minimizing intraoperative vasopressors and improving fluid management and blood product use.
RESULTS: Our approach reduced the incidence of perioperative bleeding requiring re-exploration or hemostasis and shortened in-hospital and intensive care unit stay. Functional, immunologic and graft survival outcomes have been highly encouraging in all patients.
CONCLUSIONS: Further experience is required for validation or standardization of specific anesthetic protocols. Meanwhile, our recommendations are intended as pertinent guidelines for centers performing these novel procedures.

mu阿片受体调节大鼠脊髓腹角的神经传递。
The mu opioid receptor modulates neurotransmission in the rat spinal ventral horn.
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背景：阿片类药物通过μ阿片受体（MORs）抑制兴奋性神经传递并产生镇痛。MORs表达在脊髓腹角，其功能和效应在很大程度上是未知的。因此，我们在细胞水平上研究脊髓IX层神经元内μ阿片类药物的神经调节作用。
方法：我们用全细胞膜片钳技术研究选择性μ激动剂酪氨酸-D-丙氨酰-甘氨酰-N-甲基-苯丙氨酰-甘氨酰-醇-脑啡肽（DAMGO）对新生大鼠脊髓IX层神经元内突触传递的影响。
结果：我们记录到，DAMGO在其有效浓度0.1μM的50％时，能在56％的IX层神经元产生外向电流。分析电流和电压的关系后，发现存在一个约-

86mV的逆转电位。这些电流不能被河豚毒素阻断，但能被Ba（2+）或选择性μ拮抗剂抑制。而且，在添加Cs（+）和四乙基铵或鸟苷-5'-[β-硫代]二磷酸三锂盐的溶液中此电流被抑制。此外，DAMGO能降低自发性的兴奋性和抑制性突触后电流的频率，这些效应是不能被河豚毒素改变的。
结论：我们的研究结果表明，DAMGO在激活MORs后，通过G蛋白介导的K（+）通道使脊髓IX层的神经元超极化。而且，激活突触前末梢的MORs能减少兴奋性和抑制性递质的释放。虽然传统上认为阿片类药物并不影响运动功能，但目前的研究表明μ阿片类药物对脊髓IX层神经元的神经调节效应，说明MORs能够影响运动神经的活动。
（周玲译 薛张纲校）

BACKGROUND: Opioids inhibit excitatory neurotransmission and produce antinociception through μ opioid receptors (MORs). Although MORs are expressed in the spinal ventral horn, their functions and effects are largely unknown. Therefore, we examined the neuromodulatory effects of μ opioids in spinal lamina IX neurons at the cellular level.
METHODS: The effects of the selective μ agonist [d-Ala(2),-N-Me-Phe(4), Gly(5)-ol]enkephalin (DAMGO) on synaptic transmission were examined in spinal lamina IX neurons of neonatal rats using the whole-cell patch-clamp technique.
RESULTS: DAMGO produced outward currents in 56% of the lamina IX neurons recorded, with a 50% effective concentration of 0.1 μM. Analysis of the current-voltage relationship revealed a reversal potential of approximately -86 mV. These currents were not blocked by tetrodotoxin but were inhibited by Ba(2+) or a selective μ antagonist. Moreover, the currents were suppressed by the addition of Cs(+) and tetraethylammonium or guanosine 5'-[β-thio]diphosphate trilithium salt to the pipette solution. In addition, DAMGO decreased the frequency of spontaneous excitatory and inhibitory postsynaptic currents, and these effects were unaltered by treatment with tetrodotoxin.
CONCLUSION: Our results suggest that DAMGO hyperpolarizes spinal lamina IX neurons by G protein-mediated activation of K(+) channels after activation of MORs. Furthermore, activation of MORs on presynaptic terminals reduces both excitatory and inhibitory transmitter release. Although traditionally opioids are not thought to affect motor function, the present study documents neuromodulatory effects of μ opioids in spinal lamina IX neurons, suggesting that MORs can influence motor activity.

正中神经阻滞时使用或不使用超声引导下5%葡萄糖溶液绕神经水分离技术：一项前瞻随机双盲非劣效性检验试验

Ultrasound-guided perineural circumferential median nerve block with and without prior dextrose 5% hydrodissection: a prospective randomized double-blinded noninferiority trial.

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背景：超声引导下使用水分离技术行外周神经阻滞可减少局麻药误注入血管内的风险。在这项前瞻双盲试验中，我们验证了以下假设，即正中神经的阻滞效果不会因为在局麻药注入前使用绕神经一周的水分离技术[5%葡萄糖溶液（D5W）]而减弱
方法：将拟施手部手术的患者随机分配至下列两组：超声引导下于肘部行正中神经阻滞前绕外周神经注射6mlD5W，后注射6ml局麻药（1.5%利多卡因+肾上腺素1:2000,000）（D5W-
LA组）；单纯注射6ml局麻药（LA组）。成功麻醉的时间为最终结果，成功麻醉的标准为轻触示指时无任何感觉。
结果：共有95名病人入组：D5W-
LA组43名，LA组52名。非劣效性评价呈显著差异（所有P <
0.05）：7分钟的起效时间为D5W-LA组及LA组的评价标准。示指触觉阻滞时间（平均值±SD，分别为23.9 ± 7.4和22.0 ± 7.9 分钟，95%可信区间[CI]，-5.9 至 2.1
分钟），示指尖温度觉、鱼际处感觉阻滞及运动阻滞。D5W-LA
组及LA组30分钟成功率（定义为示指完全的触觉及温度觉的消失）分别为100%和98.1%（95%CI，-6%至10%）以及95.2%和96.2%（95%CI，-13%至9%）
结论：外周神经阻滞时在局麻药注入前在超声引导下使用D5W绕外周神经行水分离不会影响阻滞效果。这一技术可以减少局麻药误注入血管的风险及由此带来的毒性反应。
(杨琰译 薛张纲校)
BACKGROUND: Ultrasound-guided perineural peripheral nerve block using a hydrodissection technique may reduce the risk of accidental intravascular local anesthetic (LA) injection. In this prospective randomized double-blind study, we tested the hypothesis that median nerve block effectiveness is not reduced when circumferential perineural hydrodissection with dextrose 5% in water (D5W) precedes LA injection.
METHODS: Patients scheduled for hand surgery were randomized to receive an ultrasound-guided median nerve block at the elbow to achieve circumferential perineural spread with either 6 mL of D5W followed by 6 mL of LA (lidocaine 1.5% with epinephrine 1:200,000) (D5W-LA group) or with 6 mL of LA alone (LA group). The primary outcome was onset time of successful anesthesia defined by a complete abolition of light touch sensation for the index finger.
RESULTS: Data from 95 patients were analyzed: 43 in the D5W-LA group and 52 in the LA group. Noninferiority tests were significant (all P < 0.05) for a critical limit of 7 minutes between D5W-LA and LA groups for onset time of the primary criterion, light touch block at index finger (mean ± SD, respectively: 23.9 ± 7.4 and 22.0 ± 7.9 minutes; 95% confidence interval [CI], -5.9 to 2.1 minutes), and for cold block at index fingertip, sensory blocks at thenar eminence, and motor block. Success rate at 30 minutes (defined as complete abolition for cold and light touch at index finger) was noted in 100% and 98.1% (95% CI, -6% to 10%) and 95.2% and 96.2% (95% CI, -13% to 9%) of patients for the D5W-LA and the LA groups.
CONCLUSION: Performing an ultrasound-guided perineural circumferential hydrodissection with D5W into which LA is injected leaves nerve block outcome unchanged. The assumption that this procedure may reduce the risk of intravascular injection and systemic toxicity remains to be demonstrated.

旋转式血栓弹力检测器（ROTEM）能够提高对心脏手术后出血的预测吗？

Does Rotational Thromboelastometry (ROTEM) Improve Prediction of Bleeding After Cardiac Surgery?

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背景：凝血障碍和大量出血是心脏手术的严重并发症，尤其是在需要长期体外循环的操作中。在医院和供应商的横向研究中，输血实践有着巨大的变异性。这种变异性可能预示着非指导性决策制定，也许是归因于缺乏可靠的、有预测性的凝血障碍的实验室检验来指导输血实践。旋转式血栓弹力检测器（ROTEM）测量多种凝血参数，提供的应用价值在于操作简易、结果迅速和测定凝血途径中多个步骤。然而，ROTEM的预测价值和实用性仍然不清楚。在本研究中，我们探讨了ROTEM对心脏手术后胸管引流量的预测价值。
方法：选取321名行包括CPB的心脏手术的病人入组。从医疗记录中获得病人数据，包括整个手术CPB后头8小时内胸管引流量（CTO）。为ROTEM分析收集围术期和手术后的血液样本。使用CTO的三种测量方法作为评估凝血障碍的主要观察指标：(i) 连续CTO；(ii) 在600ml对分的CTO（第75百分位）；以及(iii)在910ml对分的CTO（第90百分位）。在一个逐步回归模型（模型1）中，除了ROTEM数据以外，临床和血液学变量都与连续CTO显著相关（P <
0.05）。我们还创建了一个额外的模型（模型2），它包含ROTEM变量和模型1中的变量。随后的分析在解释这3个CTO观察指标P <
0.0167时宣告为有意义。用分类指数评估ROTEM数据的总体价值。
结果：就连续CTO而言，ROTEM变量提高了模型的预测能力（P <
0.0001）。对于在600ml对分的CTO（第75百分位）而言，ROTEM没有改善受试者操作特性曲线下面积（AUC）（P =
0.03）。同样的，对于在910ml对分的CTO（第90百分位），ROTEM也没有改善AUC（P = 0.23）。净重新分类指数同样表明ROTEM结果没有改善病人的总体分类（CTO ≥600 ml的P = 0.12；CTO ≥910 ml的P = 0.08）。
结论：这些结果表明与常用的临床和实验室参数相比较，ROTEM数据没有在本质上改善模型预测胸管引流量的能力。虽然有几个ROTEM参数单独与CTO相关，但是当加入到只包含临床和常规实验室参数的统计模型中，它们没有显著提高拟合优度。尽管ROTEM在心脏手术中指导输血的应用仍需测定，但是ROTEM似乎不能够提高对包括CPB的心脏手术后胸管引流量的预测。
（唐莹 译 马皓琳 李士通 校）

BACKGROUND: Coagulopathy and massive bleeding are severe complications of cardiac surgery, particularly in procedures requiring prolonged cardiopulmonary bypass (CPB). There is huge variability in transfusion practices across hospitals and providers in cross-sectional studies. This variability may indicate unguided decision-making, perhaps attributable to lack of reliable, predictive laboratory testing of coagulopathy to guide transfusion practice. Rotational thromboelastometry (ROTEM) measures multiple coagulation parameters and may provide value from its ease of use, rapid results, and measurement of several steps in the coagulation pathway. Yet, the predictive value and utility of ROTEM remains unclear. In this study, we investigated ROTEM's predictive value for chest tube drainage after cardiac surgery.

METHODS: Three hundred twenty-one patients undergoing cardiac surgery involving CPB were enrolled. Patient data were obtained from medical records, including chest tube output (CTO) from post-CPB through the first 8 postoperative hours. Perioperative and postoperative blood samples were collected for ROTEM analysis. Three measures of CTO were used as the primary end points for assessing coagulopathy: (i) continuous CTO; (ii) CTO dichotomized at 600 mL (75th percentile); and (iii) CTO dichotomized at 910 mL (90th percentile). Clinical and hematological variables, excluding ROTEM data, that were significantly correlated ($P < 0.05$) with continuous CTO were included in a stepwise regression model (model 1). An additional model that contained ROTEM variables in addition to the variables from model 1 was created (model 2). Significance in subsequent analyses was declared at $P < 0.0167$ to account for the 3 CTO end points. Net reclassification index was used to assess overall value of ROTEM data.
RESULTS: For continuous CTO, ROTEM variables improved the model's predictive ability ($P < 0.0001$). For CTO dichotomized at 600 mL (75th percentile), ROTEM did not improve the area under the receiver operating characteristic curve (AUC) ($P = 0.03$). Similarly, for CTO dichotomized at 910 mL (90th percentile), ROTEM did not improve the AUC ($P = 0.23$). Net reclassification index similarly indicated that ROTEM results did not improve overall classification of patients ($P = 0.12$ for CTO ≥600 mL; $P = 0.08$ for CTO ≥910 mL).
CONCLUSIONS: These results suggest that ROTEM data do not substantially improve a model's ability to predict chest tube drainage, beyond frequently used clinical and laboratory parameters. Although several ROTEM parameters were individually associated with CTO, they did not significantly improve goodness of fit when added to statistical models comprising only clinical and routine laboratory parameters. ROTEM does not seem to improve prediction of chest tube drainage after cardiac surgery involving CPB, although its use in guiding transfusion during cardiac surgery remains to be determined.

通过神经活动的直接指数来测定麻醉药起效的动力学

Kinetics of Anesthetic Onset Measured with a Direct Index of Neural Activity

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背景:先前麻醉药在作用部位的摄取和消除的动力学模型采用了来自于脑电图的测定数据。这种测定数据是滞后于当时的脑活动的，因为需要时间来获取信号样本和提取测定数值。通过直接测量麻醉药物的活动，我们可以更精确地获得大脑摄取药物的模型。
方法：在志愿者中，采取双盲单周期设计，在使用30%氧化亚氮洗入和洗出过程中，我们使用一个广为著名的神经运动试验对他们进行重复的测量，即两目标的指叩测验。我们还进行了认知功能的测验，即数字符号替换测试，以评估最大药物效果。对作用部位的浓度建模来自呼气末浓度的测量，使用一个简单的洗入和洗出指数函数，其半衰期在0.5到3分钟内。在使用0和5%氧化亚氮的对象中进行比较。
结果：我们观察了20个对象。30%浓度氧化亚氮组，在数字符号替换测试中表现始终减低。指叩的频率也减少了，但是效果却不太一致，在20个受试者中只有9个表现出显著的个

别指叩频率的减少。在这些患者中，在模拟的大脑浓度与药效之间的关系在将半衰期设定为2分钟时比1.5或者3分钟更佳。
结论：当给予亚麻醉浓度时，氧化亚氮具有起效和消除快的特点，与其半衰期为2分钟一致。此数值低于在麻醉过程中使用脑电图监测的研究预期，但符合在清醒的受试者观察到的活跃脑组织的血流监测情况。对有意识的受试者反应的研究可能有助于麻醉药动力学的进一步研究。
（余亦南 译 马皓琳 李士通 校）
BACKGROUND: Previous modeling of the kinetics of uptake and elimination of anesthetic drugs from the site of action has used measures derived from the electroencephalogram. Such measures lag the current brain activity because of the time needed to acquire a signal sample and derive the measure. With a direct measure of anesthetic activity, we could model brain uptake more exactly.
METHODS: In volunteers, using a double-blind single-session design, we made repeated measurements using a well-known psychomotor test, the 2 target tapping test, during the washin and washout of 30% nitrous oxide. We also assessed maximal drug effect with a test of cognitive function, the digit symbol substitution test. Concentration at the site of action was modeled from end-tidal measurements, using a simple exponential washin and washout function, with half-times between 0.5 and 3 minutes. Comparisons were made within subjects, using 0 and 5% nitrous oxide.
RESULTS: We studied 20 subjects. Nitrous oxide, at 30%, consistently reduced performance of the digit symbol substitution test. Tapping frequency was also reduced, but the effect was less consistent, and only 9 of 20 subjects showed a significant individual reduction in tapping frequency. In these subjects, the relationship between the modeled brain concentration and drug effect was better with a half-time set at 2 minutes, compared with 1.5 or 3 minutes.
CONCLUSIONS: Given in subanesthetic concentrations, nitrous oxide has rapid onset and offset, consistent with a half-time of 2 minutes. This value is less than the values expected from studies during anesthesia using processed electroencephalogram, but consistent with measures of blood flow to active cerebral tissue in conscious subjects. Studies of performance in conscious subjects may aid further studies of anesthetic kinetics.

氧化亚氮在异氟烷麻醉中对脑电双相干的影响

The Impact of Nitrous Oxide on Electroencephalographic Bicoherence During Isoflurane Anesthesia

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背景：我们以前报道脑电双相干（BIC），一个信号的频谱成分之间相位耦合程度，在异氟烷麻醉中显示两个高峰期。Hayashi等人（《英国麻醉学杂志》2007；99：389-95）也揭示了，加用氯胺酮时在10

Hz左右的双相干的峰值频率增高。因为氧化亚氮和氯胺酮有一些共同的特点，它们往往被视为同一类的麻醉剂。在这里，我们研究了氧化亚氮在异氟烷麻醉中对脑电双相干和其他脑电波衍生物的影响。
方法：20例（年龄34-
72岁，ASA分级I和II）行择期腹腔镜手术，不论男女都包括在内。原始EEG数据，EEG衍生参数，用A-
1050双频指数（BIS）显示器和我们自己创作的用于BIS软件的脑电双频谱分析仪记录原始EEG数据和EEG衍生参数。我们比较了脑电波双相干的2个峰值（在4Hz左右的BIC低峰值和在10Hz左右的BIC高峰值），以及BIS和95%的频谱边界频率（SEF95
95）。使用3mg/kg硫喷妥钠和3μg/kg芬太尼麻醉诱导。气管插管后，用异氟烷（呼出浓度为1.0%）、氧气和氮气麻醉维持。追加芬太尼并且维持估计效应室浓度>
1.5ng/ml。我们在麻醉诱导后1小时获得基线数据，然后加入70％氧化亚氮30分钟。
结果：在氧化亚氮开启之前，BIC低峰值和BIC高峰值分别为49.3％±8.3％和42.4％±11.0％。开启10分钟后，BIC高峰值降低至14.9％±5.9％（P
<0.001），并且在整个氧化亚氮吸入过程中有统计学意义上的显着降低。同时，在给予氧化亚氮的早期，BIC低峰值瞬时降低至37.2％±12.8％（P =
0.01）。在氧化亚氮开启之前，BIS和SEF95分别为43.2±4.9和13.1±2.0Hz。在给予氧化亚氮期间，BIS和SEF95都有轻度但在统计学意义上显著减少。
氧化亚氮开启15分钟后，BIS和SEF95分别为35.7±6.2（P <0.001）和8.6±1.8Hz（P
<0.001），并且在出现大的δ波时，二者下降得更多。
氧化亚氮停止后15分钟，BIS、SEF95以及BIC的低峰值和BIC高峰值恢复至氧化亚氮开启之前的水平。
结论：与氯胺酮的作用不同，氧化亚氮在异氟烷麻醉中显著降低BIC的高峰值。
（崔晓娜 译 马皓琳 李士通 校）
BACKGROUND: We previously reported that electroencephalographic (EEG) bicoherence, the degree of phase coupling among the frequency components of a signal, showed 2 peaks during isoflurane anesthesia. Hayashi et al. (Br J Anaesth 2007;99:389–95) also revealed that the peak frequency of bicoherence around 10 Hz increased when ketamine was added. Because nitrous oxide (N2O) and ketamine share several common features, they are often treated as the same category of anesthetic. Here, we investigated the effect of N2O on EEG bicoherence and other EEG derivatives during isoflurane anesthesia.
METHODS: Twenty patients (aged 34–72 years, ASA physical status I and II) of either gender who underwent elective laparoscopic surgery were included. Raw EEG data, along with EEG-derived parameters, were recorded using an A-1050 Bispectral Index (BIS) monitor and our self-authored Bispectral Analyzer for BIS software. We compared 2 peaks of EEG bicoherence (pBIC–low, around 4 Hz; and pBIC–high, around 10 Hz), as well as BIS and spectral edge frequency 95% (SEF95). Anesthesia was induced with 3 mg • kg−1 thiopental and 3 μg • kg−1 fentanyl. After tracheal intubation, anesthesia was maintained with isoflurane (expired concentration at 1.0%), oxygen, and nitrogen. Fentanyl was added and maintained at an estimated effect-site concentration of >1.5 ng • mL−1. We obtained baseline data 1 hour after induction of anesthesia, then 70% N2O was added for 30 minutes.
RESULTS: Before N2O, pBIC–low and pBIC–high were 49.3% ± 8.3% and 42.4% ± 11.0%. Ten minutes after starting N2O, pBIC–high decreased to 14.9% ± 5.9% (P < 0.001), and it was

statistically significantly lower throughout the N2O period. Meanwhile, pBIC–low transiently decreased to 37.2% ± 12.8% (P = 0.01) during the early phase of N2O administration. Before N2O, BIS and SEF95 were 43.2 ± 4.9 and 13.1 ± 2.0 Hz, respectively. Both BIS and SEF95 slightly but statistically significantly decreased during N2O administration. Fifteen minutes after starting N2O, BIS and SEF95 were 35.7 ± 6.2 (P < 0.001) and 8.6 ± 1.8 Hz (P < 0.001) and they decreased more when large δ waves emerged. Fifteen minutes after stopping N2O, BIS, SEF95, as well as pBIC–low and pBIC–high returned to pre-N2O values.
CONCLUSION: Dissimilar to the effect of ketamine, N2O significantly decreases pBIC–high during isoflurane anesthesia.

振动-触觉显示器用于临床监测的实时评估

A Vibro-Tactile Display for Clinical Monitoring: Real-Time Evaluation

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背景：振动-
触觉显示器使用人体皮肤为麻醉医生传递生理监测的参数，提供患者状态改变的线索。这项研究评估了我们最近所开发出的一种新型振动-
触觉显示腰带在实时临床环境下的实用性和耐磨性，并测定了它在麻醉医生用的时候鉴别事件的准确性。
方法：这是一项前瞻性的观察性研究。在常规麻醉下，将标准生理监测仪连接到一种软件工具上，这种软件使用特定的算法来自动地识别无创平均动脉压、每分呼气量、气道峰压、呼气末二氧化碳分压的变化趋势。将这种软件无线连接到麻醉医生束的振动-
触觉腰带上。每项生理参数分别在腰带上4个触觉定位中的1个显示。方向（增加/减少）和变化的两种水平（小/大）均编码到刺激模式上。每一位麻醉医生均完成了一个培训期。在麻醉期间常规生理监测时即可实时启动该系统。当系统检测到患者的改变时，腰带会在适当的部位振动，根据改变的幅度和方向相对应不同的振动模式。麻醉医生使用触屏显示器先鉴别参数再鉴别改变的幅度和方向来获得振动-
触觉的信息。对每位研究者均进行问卷调查以确定实用性和耐磨性。主要的研究结果为生理趋势检测的准确率、变化方向和变化水平。平均的实用性评分及耐磨性指标为次要研究结果。本研究假设麻醉医生根据这种振动-
触觉腰带来实时鉴别各类事件的准确率为90%，且这种腰带具备实用性和耐磨性。
结果：17位麻醉医生共评价了57例的显示器结果。每例腰带的平均使用时程（SD）为75（41）分钟。7例由于技术错误排除在分析之外。81%（可信区间[CI]，77%至84%）的刺激均进行了解码。生理趋势、变化的方向和变化的水平鉴别的准确率分别为97.7%（CI 96%-99%）、94.9%（CI 92%-97%）和93.5%（CI 91%-

96%）。14名麻醉医生完成了实用性和耐磨性的问卷调查。平均实用性得分为4.8，最高得分为7。
结论：麻醉医生认为这种振动-
触觉腰带具备实用性和耐磨性，能准确解码实时临床环境下振动-触觉的信息。
（邱郁薇 译 马皓琳 李士通 校）
BACKGROUND: Vibro-tactile displays use human skin to convey information from physiological monitors to anesthesiologists, providing cues about changes in the status of the patient. In this investigation, we evaluated, in a real-time clinical environment, the usability and wearability of a novel vibro-tactile display belt recently developed by our group, and determined its accuracy in identifying events when used by anesthesiologists.
METHODS: A prospective observational study design was used. During routine anesthesia, a standard physiological monitor was connected to a software tool that used algorithms to automatically identify changing trends in mean noninvasive arterial blood pressure, expired minute ventilation, peak airway pressure, and end-tidal carbon dioxide partial pressure. The software was wirelessly interfaced to a vibro-tactile belt worn by the anesthesiologist. Each physiological variable was mapped to 1 of 4 tactor locations within the belt. The direction (increase/decrease) and 2 levels of change (small/large) were encoded in the stimulation patterns. A training session was completed by each anesthesiologist. The system was activated in real-time during anesthesia alongside routine physiological monitors. When the algorithms detected changes in the patient, the belt vibrated at the appropriate location with the pattern corresponding to the level and direction of change. Using a touch screen monitor the anesthesiologist was to enter the vibro-tactile message by first identifying the variable, then identifying the level and direction of change. Usability and wearability questionnaires were to be completed. The percentage of correct identification of the physiological trend, the direction of change, and the level of change were primary outcome variables. The mean usability score and wearability results were secondary outcome variables. We hypothesized that anesthesiologists would correctly identify the events communicated to them through the vibro-tactile belt 90% of the time, and that anesthesiologists would find the vibro-tactile belt usable and wearable.
RESULTS: Seventeen anesthesiologists evaluated the display during 57 cases. The belt was operational for a mean (SD) duration of 75 (41) minutes per case. Seven cases were excluded from analysis because of technical failures. Eighty-one percent (confidence interval [CI], 77% to 84%) of all stimuli were decoded. The physiological trend, the direction of change, and the level of change were correctly identified for 97.7% (CI 96%–99%), 94.9% (CI 92%–97%), and 93.5% of these stimuli (CI, 91%–96%), respectively. Fourteen anesthesiologists completed the usability and wearability questionnaires. The mean usability score was 4.8 of a maximum usability score of 7.
CONCLUSIONS: Anesthesiologists found a vibro-tactile belt to be wearable and usable and could accurately decode vibro-tactile messages in a real-time clinical environment.

缺氧再灌注后早期抗氧化治疗和后期降低体温对新生猪没有神经保护作用

Early Antioxidant Treatment and Delayed Hypothermia After Hypoxia–Ischemia Have No Additive Neuroprotection in Newborn Pigs

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背景：降低体温在新生儿缺血缺氧性脑病实施和临床疗效是有限的，部分源于延迟建立低温和接入设备。在仔猪的缺血缺氧性脑病模型中，恢复后6小时壳核中的半数神经元已经显示出缺血性细胞病理改变。本文验证了恢复后30min时给予超氧化物歧化酶－过氧化氢酶类似物EUK-134治疗与在复苏后4小时实施的1天全身低体温结合应用提供进一步的神经保护作用这一假设。

方法：麻醉后的仔猪接受40分钟低氧（吸入氧浓度10%），随后7分钟闭塞气道并经过复苏。常温组体温维持在38.5℃，低温组维持在34℃。所有组在复苏后第一天里机械通气、镇静及注射肌肉松弛剂。通过外观和立体细胞计数评估神经病理学改变。

结果：复苏后10天时，用盐溶液处理的正常体温组的壳核中神经元活力降低至假操作对照组（100%±15%）的17%±6%（±95%置信区间）。正常体温复苏组静脉内注射EUK-134（复苏后30分钟时2.5mg/kg+1.25mg/kg/h至复苏后4小时）导致壳核中的神经元活性为40%±12%。盐溶液治疗后进行后续低体温具有部分保护作用（46%±15%）。早期EUK-134处理与后期低温也产生了部分保护作用（47% ± 18%），但没有比单独EUK-134处理（差异的可信区间：–15%～29%）或后期低温（–16%～19%）显著增强。此外，对神经元缺失并不严重的尾核或旁矢状面的新皮质同样没有额外的神经保护作用。

结论：本文推断早期使用这种抗氧化剂治疗不能从实质上增加后期低体温保护缺血缺氧损伤的新生儿中高度易受伤害的神经元的治疗学益处，可能由于基底神经节神经元在接受EUK-134时已经收到不可逆的细胞死亡信号，或者由于这种物质和低体温减弱了类似的损伤机制。

（许辛 译，马皓琳 李士通 校）

BACKGROUND: The implementation and clinical efficacy of hypothermia in neonatal hypoxic–ischemic (HI) encephalopathy are limited, in part, by the delay in instituting hypothermia and access to equipment. In a piglet model of HI, half of the neurons in putamen already showed ischemic cytopathology by 6 hours of recovery. We tested the hypothesis that treatment with the superoxide dismutase–catalase mimetic EUK-134 at 30 minutes of recovery provides additive neuronal protection when combined with 1 day of whole-body hypothermia implemented 4 hours after resuscitation.

METHODS: Anesthetized piglets were subjected to 40 minutes of hypoxia (10% inspired oxygen) followed by 7 minutes of airway occlusion and resuscitation. Body temperature was maintained at 38.5°C in normothermic groups and at 34°C in hypothermic groups. All groups were mechanically ventilated, sedated, and received muscle relaxants during the first day of recovery. Neuropathology was assessed by profile and stereological cell-counting methods.

RESULTS: At 10 days of recovery, neuronal viability in putamen of a normothermic group treated with saline vehicle was reduced to 17% ± 6% (±95% confidence interval) of the value in a sham-operated control group (100% ± 15%). Intravenous infusion of EUK-134 (2.5 mg/kg at 30 minutes of recovery + 1.25 mg/kg/h until 4 hours of recovery) with normothermic recovery

resulted in 40% ± 12% viable neurons in putamen. Treatment with saline vehicle followed by delayed hypothermia resulted in partial protection (46% ± 15%). Combining early EUK-134 treatment with delayed hypothermia also produced partial protection (47% ± 18%) that was not significantly greater than single treatment with EUK-134 (confidence interval of difference: –15% to 29%) or delayed hypothermia (–16% to 19%). Furthermore, no additive neuroprotection was detected in caudate nucleus or parasagittal neocortex, where neuronal loss was less severe. **CONCLUSIONS:** We conclude that early treatment with this antioxidant does not substantially enhance the therapeutic benefit of delayed hypothermia in protecting highly vulnerable neurons in HI-insulted newborns, possibly because basal ganglia neurons are already undergoing irreversible cell death signaling by the time EUK-134 is administered or because this compound and hypothermia attenuate similar mechanisms of injury.

关于面部移植围术期管理的调查

Perioperative Management of Face Transplantation: A Survey

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背景：自从2005年法国报道首例异体面部移植以来，已有4个国家完成了18例手术，并且这一速度正在增加。
方法：我们设计了一项评价面部异体移植中麻醉相关管理和理论基础的调查。调查发送至全世界完成的前14例面部移植术的首席麻醉医师。
结果：本调查共回收13例面部移植相应的问卷应答。手术和麻醉持续时间的中位数为19小时（95%可信区间15-23小时）。11例病例中，对受体复杂细微结构的外科准备和解剖最为费时。失血量相当大。所有患者均输入浓缩红细胞（中位数20 U，95%可信区间5-28 U）。输入晶体液的中位数为13L（95%可信区间10-18L）。
结论：在面部异体移植过程中，麻醉医师必须进行长时间的麻醉，并作好移植物再灌注后快速失血的准备。
（陈彬彬译 马皓琳 李士通校）

BACKGROUND: Since the first facial allograft transplantation was reported in France in 2005, 18 cases have been performed in 4 countries and the rate is increasing.

METHODS: We have devised a survey to assess anesthesia-related management and rationale of facial allograft transplantation. It was sent to the lead anesthesiologists of the first 14 face transplants performed worldwide.
RESULTS: Responses were received corresponding to 13 face transplants. The median duration of surgery and anesthesia was 19 hours (95% confidence interval 15–23 hours). The surgical preparation and dissection of multiple small anatomical structures of the recipient was time-consuming for 11 cases. Blood loss was considerable. All patients received packed red blood cells (median 20 U, 95% confidence interval 5–28 U). A median of 13 L of crystalloid was administered (95% confidence interval 10–18 L).
CONCLUSIONS: During facial allograft transplantation, the anesthesiologist must be prepared for a long anesthetic with rapid blood loss after reperfusion of the graft.

肺门高压对活体肝移植受者术中右心室功能的影响

The Impact of Portopulmonary Hypertension on Intraoperative Right Ventricular Function of Living Donor Liver Transplant Recipients

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背景：肺门高压（PPH）加重了在肝移植时已经暴露在生理应激状态下的右心室（RV）的负担。PPH对于右心室功能影响的程度，尤其是再灌注早期，还没有前瞻性对照试验对此进行过充分的评估。在这项研究中，我们前瞻性地对PPH对于活体肝移植受者的右心室功能的影响进行了量化。
方法：20例接受活体肝脏移植的患者根据平均肺动脉压（mPAP）水平进行分层，分别分为对照组（MPAP<25毫米汞柱）和PPH组（MPAP≥25毫米汞柱）。采用标准麻醉方法和监测。使用能够测量右心室射血分数（RVEF）的光纤肺动脉导管。记录麻醉诱导后、肝切除术毕时、门脉开放前、再灌注后5分钟和30分钟及缝皮时的血流动力学数据。
结果：与对照组相比，PPH组门脉开放后RVEF和每搏输出量明显降低，中心静脉压和RV舒张末期容积指数显著较高。整个手术过程中，PPH组的肺血管阻力指数和平均肺动脉压均显着高于对照组，但RV每搏作功指数在两组之间没有明显差别。在PPH组，再灌注之后的RVEF与基线相比明显下降，而对照组无此下降过程。
结论：肝移植术中，轻度至中度PPH与RVEF降低相关，特别是在再灌注之后，可能是因为PPH病人的RV收缩储备减少了。轻度至中度PPH患者对于RVEF的这种降低在临床上能很好地耐受。
（安光惠 译 马皓琳 李士通 校）

BACKGROUND: Portopulmonary hypertension (PPH) burdens a right ventricle (RV) already exposed to physiologic stress during liver transplantation. The magnitude of the impact of PPH on RV function, especially early reperfusion, has not been evaluated adequately by prospective controlled trials. In this study, we prospectively quantified the impact of PPH on the RV function in living donor liver transplant recipients.

METHODS: Twenty patients undergoing living donor liver transplant were stratified based on mean pulmonary artery pressure (mPAP) into a control group (mPAP <25 mm Hg) and a PPH group (mPAP ≥25 mm Hg). Standard anesthetic technique and monitoring were used. Fiberoptic pulmonary artery catheters enabled to measure RV ejection fraction (RVEF) were used. Hemodynamics were recorded after induction of anesthesia, the end of hepatectomy, before portal unclamping, 5 and 30 minutes after reperfusion, and at skin closure.
RESULTS: The PPH group had significantly lower RVEF, stroke volume, and higher central venous pressure and RV end-diastolic volume index after portal unclamping versus the controls. Pulmonary vascular resistance index and mPAP were significantly higher throughout the operation in the PPH group, but RV stroke work index did not differ significantly between groups. RVEF was significantly reduced in the PPH group after reperfusion compared with baseline, but the control group did not experience such a reduction.
CONCLUSIONS: Mild to moderate PPH was associated with reduced RVEF during liver transplantation, especially after reperfusion, likely because of a reduced RV contractile reserve in PPH patients. This reduction in RVEF was clinically well tolerated by patients with mild to moderate PPH.

新型小分子α9α10烟碱受体拮抗剂可以预防并逆转大鼠化疗诱发的神经性疼痛

Novel Small Molecule α9α10 Nicotinic Receptor Antagonist Prevents and Reverses Chemotherapy-Evoked Neuropathic Pain in Rats

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背景：外周神经病变是一种常见的剂量限制性的化疗副作用。尚没有临床证实有效的镇痛药可以治疗这种病情。已有研究检验了不同种类的药物并得出了混杂的结果。鉴定镇痛的新型分子靶向很重要。一般认为对α9α10烟碱乙酰胆碱受体（nAChR）亚型（脑内缺乏）的拮抗是产生α-
芋螺毒素肽类的镇痛效果的基础。我们发现来自于四价、三价、二价氮杂芳香季铵盐（α9α10
nAChRs的高效价选择性拮抗剂）家族的新型非肽类小分子类似物对于神经损伤引起的神经病变和持续的炎症性疼痛的大鼠模型可以产生与剂量相关的镇痛。尚无试验在由应用药物（例如化疗）引起的神经病变模型中进行。
方法:这项研究在长春新碱诱发神经病变的大鼠模型中研究了一种主要的二价类似物ZZ1-61c的特性。给雄性SD大鼠重复剂量的这种长春花生物碱（长春新碱）（100 μg/kg/天 IP，第1至5天和第8至12天）。在长春新碱应用同时或应用完成后（到第15天神经损伤作用最大时开始）给予ZZ1-61c（100 μg/kg/天 IP）。应用von
Frey毛发和爪压试验来评估反应性。记录ZZ1-
61c对小鼠的运动功能（rotarod方法）和肌肉力量（握力测试）的影响的特点。

结果：研究表明随长春新碱重复应用而进展到神经病变（对于机械刺激的痛觉超敏反应）。ZZ1-61c对于以下情况表现出预防和恢复作用：（1）同时给予ZZ1-61c减轻长春新碱引起的对压力的敏感性；（2）在化疗停药后应用ZZ1-61c可以减轻已形成的神经病变。ZZ1-61c不引起运动功能障碍（rotarod方法）或肌肉无力（握力测试）。
结论：这项研究表明ZZ1-61c（一种对α9α10 nAChR有着独特拮抗机制的新型化合物）可能是一种用于预防和减轻由化疗引起的神经疼痛潜在的候选药物。这项策略或许可以提供有效的治疗而避免对nAChR有中枢作用的拮抗剂的毒性。
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BACKGROUND: Peripheral neuropathy is a common dose-limiting side effect of chemotherapy. There are no clinically proven analgesics for the treatment of this condition. Drugs from different classes have been tested with mixed results. Identification of novel molecular targets for analgesic(s) is important. Antagonism of the α9α10 nicotinic acetylcholine receptor (nAChR) subtype (absent in brain) is thought to underlie analgesic efficacy of peptide α-conotoxins. We found novel nonpeptide small molecule analogs from a family of tetrakis-, tris-, and bis-azaaromatic quaternary ammonium salts (high potency with selectivity as antagonists at the α9α10 nAChRs) to produce dose-related analgesia in rat models of nerve injury-evoked neuropathy and persistent inflammatory pain. No tests were done in a model of neuropathy induced by drug administration (ie, chemotherapy).
METHODS: In this study, a lead bis-analog, ZZ1-61c, was characterized in a rat model of vincristine-evoked neuropathy. Male Sprague-Dawley rats were repeatedly dosed with the vinca-alkaloid, vincristine (100 μg/kg/day IP, days 1 to 5 and 8 to 12). ZZ1-61c (100 μg/kg/day IP) was given either along with or after completion of vincristine (commencing by day 15 when neuropathy was maximum). Responsiveness was assessed with von Frey hairs and the paw-pressure test. The effects of ZZ1-61c on motor function (rotarod) and muscle strength (grip test) were characterized in naïve rats.
RESULTS: The development of neuropathy was demonstrated with repeated dosing of vincristine (pain hypersensitivity in response to mechanical stimulation). ZZ1-61c showed both preventive and restorative effects on this condition: (1) vincristine-evoked sensitivity to pressure was reduced by coadministration of ZZ1-61c; (2) established neuropathy was diminished by ZZ1-61c after cessation of chemotherapy. ZZ1-61c did not cause motor dysfunction (rotarod) or muscular weakness (the grip test).
CONCLUSIONS: This study suggests that ZZ1-61c, a novel compound with a unique mechanism of antagonistic action at the α9α10 nAChR, may be a potential drug candidate for prevention and attenuation of neuropathic pain resulting from chemotherapy. Such a strategy may provide effective treatment that circumvents toxicity of centrally acting agonists at nAChR.