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術前動脈脈壓水準與下肢動脈搭橋術後圍術期死亡率無明顯關聯

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

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背景：在心臟手術患者中，動脈脈壓性高血壓與圍術期的死亡率相關。但對於其他高手術風險人群，兩者的相關性仍不得而知。本研究旨在驗證術前動脈脈壓的增加與下肢動脈搭橋術後 30 天和 1 年內所有原因引起的死亡率之間關係。

方法：對 6 年內（從 2002 年 1 月至 2008 年 1 月）單中心 556 名腹股溝下動脈搭橋手術患者進行回顧性分析。麻醉給藥前，使用無創示波袖帶測量平均動脈壓、收縮壓及舒張壓，再根據收縮壓減去舒張壓計算得到脈壓。在研究中使用社會保險死亡指數（social security death index，SSDI）確定所有受試者的死亡率，同時還記錄了每位元患者的合併症、術前用藥及麻醉方法。然後使用單變數和多變數的分析方法評估動脈脈壓與主要預後變數及所有病因引起的 30 天和 1 年內死亡率之間的關係。

結果：在 556 例患者中，大部分存在脈壓升高（其中 44.9%脈壓大於 80），30 天的死亡率爲 5.1%，1 年內的死亡率爲 17.8%。術前脈壓值與 30 天及 1 年內的總死亡率均無明顯相關性（p 分別爲 0.35 和 0.14）。30 天死亡率的獨立預測因數爲年齡≥80 歲（p=0.02），ASA 分級≥IV（p=0.04），肌酐的基礎水準>2.0mg/dL（P<0.0001）及急診

手術（p=0.009）。這些因素，另外還有修訂後的李氏心臟風險指數評分、女性及以壞疽或潰瘍作爲手術指征，同樣與 1 年內的死亡率相關。

結論：本次研究結果表明術前脈壓升高可能與下肢動脈搭橋術後的總體死亡率無關。

（夏蘇雲 譯 陳傑 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.

綜述：老年門診患者接受日間手術時圍手術期的監護

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

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隨著日間手術的數量在老齡化社會日益增加，對於老年人圍手術期的循證監護也日漸重要。在目前先進的麻醉，手術和監測技術下，門診設施對接受擇期手術的老年患者提供了潛在的優勢。此綜述總結了老年的生理、藥理影響及其對於麻醉劑的反應。對老年門診患者的術前評估最需要考慮的是合併症、基於過程的不同麻醉技術其優缺點以及對於日間手術術後併發症（包括譫妄、認知障礙、疲勞、頭暈、疼痛和胃腸功能紊亂）處理的建議。本文討論了此類患者日益增長的門診手術所帶來的挑戰。當無法從同行評議類文獻中得到老年手術人群的資訊時，那麼只能從其他門診手術人群中提取相關資訊。

（範逸臣 譯 陳傑 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.

相容溫度探頭的改良磁共振顯像運用于兒童的性能驗證

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)檢查過程中,兒童很可能存在體溫變化的風險。寒冷的 MRI 環境保保持 MRI 磁性，但可導致嚴重低體溫。另一方面,因射頻引起的組織加熱可導致高熱，尤其是長時間的檢查。由於缺乏 MRI 相容的核心溫度探頭、溫度評估是不可靠的,並且必須計算特定吸收率相關的患者熱增益來決定許可的掃描時間。本文比較 MRI 相容的溫度探頭和改良的標準食道核心體溫探測器在兒童中的應用結果。

方法：入組對象爲行全身麻醉兒童,每個病人以自身對照。核心體溫通過三種不同的設備測定: (1)一個貼于兒童皮膚表面的 MRI 相容皮膚表面溫度光纖探頭(MRI-skin);(2)一個位於鼻咽部的 MRI 相容溫度光纖探頭(MRI-core)，頂端配有一次性套筒;(3) 位於食道或鼻咽的標準溫度監控(STRD)。使用 Bland-Altman 方法進行統計分析。

結果：一共入組 60 名兒童，平均年齡爲 7.8±6 歲(平均±標準差) ，平均體重爲 32.4 (±26.4)kg。STRD 和 MRI-core 核心溫度測量之間的估計誤差爲 0.06° C(可信區間[CI]:−0.02,0.15),STRD 和 MRI-skin 之間估計誤差爲 1.19° C(CI:0.97,1.41)。根據 Bland-Altman 分析, STRD 和 MRI-skin 探頭以及和 MRI-core 探頭 95%的一致性區間分別爲 0.9-3.4,以及-1.3-1.2,。

結論：本文結果顯示：在全身麻醉下行普外科手術的患兒中，標準食管測量核心溫度和使用改良 MRI-core 探頭測量核心溫度之間具有良好的一致性。能夠在 MRI 系統中準確評估核心溫度可安全地延長檢查時間,因此減少重複麻醉暴露,提高病人安全,提高兒童的監護品質。

（龔寅 譯 陳傑 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℃ (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.

簡報：分娩時宮外治療時胎兒臍血的血清芬太尼濃度的量化

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

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給予胎兒芬太尼肌注經常在宮外分娩期治療時應用（EXIT）。本文對臍靜脈血液中芬太尼濃度進行定量，對來自 13 名胎兒的 13 個樣本進行了分析。中位數和範圍如下：分娩時新生兒體重爲 3000 克（2020-3715 克）。芬太尼肌注劑量爲 60 微克（45-65 微克）。肌注芬太尼到樣本採集之間的時間爲 37 分鐘（5-86 分鐘）。芬太尼在所有的樣本均檢測到，血清濃度中位數爲 14.0 納克/毫升（4.3-64.0 納克/毫升）。

（俞劼晶 譯 陳傑 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).

急性等容血液稀釋可加重小鼠脊髓缺血後的神經損傷

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

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背景：急性等容血液稀釋（Acute Normovolemic hemodilution, ANH）常應用於胸腹部的主動脈手術中。然而，ANH 對脊髓缺血性損傷的效應目前尚不清楚。由於在低於一定水準血細胞壓積進行血液稀釋可加重腦缺血後的神經損傷，因此本文假設 ANH 可加重脊髓缺血後的神經損傷。本實驗目的在於研究 ANH 對於脊髓缺血損傷的影響。

方法：30 只雄性 sprague-Dawley 小鼠被隨機分爲 3 組：非血液稀釋組（組 C）、目標血細胞比容 30% 組（HD30 組）以及目標血細胞比容 25%組（HD25 組）。通過抽血及同時行等容量羥乙基澱粉輸注來建立 ANH 模型。脊髓缺血和再灌注通過在腹主動脈放置頂端帶氣囊的導管完成，並記錄平均動脈壓的變化。術後連續 7 天使用運動障礙評分（motor deficit score, MDS）（0=正常，5=完全截癱）分析和記錄下肢神經功能。在最後的 MDS 分析後，計算脊髓內運動神經元的數量。

結果：HD25 組在 ANH 過程後期出現低血壓。C 組和 HD30 組經歷了 3 分鐘的再灌注低血壓，而 HD25 組經歷了 6 分鐘的低血壓。HD25 組中有 2 只小鼠在實驗過程中死亡。再灌注後 7 天，C 組、HD30 組和 HD25 組的 MDS 中位數分別是 1.0（0.5–2.00）、1.0（0.5–2.0）和 4.0（2.8–4.2）（95%可信區間）。和 C 組比較，HD25 組的 MDS 顯著升高（矯正 p=0.0018；中位數差異 95%區間：1.0-3.5）。C 組、HD30 組和 HD25 組的脊髓前角運動神經元的數量分別是：26.5（25.0–27.5）、23.5（22.0–26.5）和 12.5（8.4–16.6）（中位數[95%可信區間]）。HD25 組的運動神經元數量顯著低於 C 組（矯正 p<0.0001，中位數差異 95%可信區間：9.0-18.0）。

結論：本實驗研究結果顯示：術中血細胞比容低至 25%的 ANH，同時伴隨低血壓可導致再灌注期間平均動脈壓基線回復的延遲，並加重脊髓缺血後神經系統的預後。*1*

（俞芳 譯 陳傑 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.

超聲引導的髂腹股溝/髂腹下神經阻滯治療持續性腹股溝疝修補術後疼痛研究：一項隨機，雙盲，安慰劑對照，交叉臨床試驗

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:髂腹股溝和髂腹下神經阻滯常用於臨床治療腹股溝疝修補術後持續疼痛的治療，但關於此內容還沒有對照研究發表。本對照試驗探究了超聲引導下對髂腹股溝和髂腹下神經注射利多卡因進行神經阻滯的鎮痛和感覺效應

方法：該隨機，雙盲，安慰劑對照，交叉試驗納入 12 名患有嚴重腹股溝疝修補術後持續疼痛的患者，與 12 名健康人進行對照。在每次超聲引導神經阻滯前後在腹股溝區域進行評估，內容包括採用標準化數值評級疼痛量表（0-10），冷軋輥感覺投射，以及定量感覺試驗（QST）。進針方向爲髂前上棘上內側 1-2cm。預後爲疼痛評分，感覺投射以及 QST 的阻滯前後變化。利多卡因有反應定義爲注射利多卡因阻滯後疼痛減輕≥80%或者注射安慰劑後疼痛減輕≤25%。利多卡因無反應定義爲注射利多卡因阻滯後疼痛減輕＜80%或注射安慰劑後疼痛減輕≤25%，安慰劑反應定義爲注射安慰劑後疼痛減輕＞25%。

結果:12 名疼痛患者中 1 名對利多卡因有反應，6 名對利多卡因無反應，5 名對安慰劑有反應。利多卡因阻滯後未發現 QST 改變。在健康人對照組中，10 名健康者在利多卡因阻滯後腹股溝區冷感覺減退。另外，QST 檢查顯示與安慰劑阻滯相比，利多卡因阻滯組腹股溝區超閾值的熱痛覺反應顯著降低（95%可信區間=-3.5~-0.5，P = 0.008）

結論：使用利多卡因在超聲引導的髂前上棘水準阻滯髂腹股溝和髂腹下神經對持續性腹股溝疝修補術後疼痛的診斷和治療無效。

（陸秉瑋 譯 陳傑 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.

多肽和脂質大麻素在脊髓水準對關節痛的影響

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，是一個從血紅蛋白的 α 鏈上裂解的一個九肽（序列：PVNFKFLSH），和神經大麻素 CB1 受體有特異性相互作用。因此，它似乎是唯一的與大麻活動相關的肽結構。此項研究的目標是進一步描述此肽，並通過研究多不飽和脂肪酸衍生物、2 arachidonoyl（2-AG）和花生四烯酸乙醇胺在脊髓水準對機械痛的影響來顯示它們的鎮痛效能。

方法：從原位中和反應固相製備 HP。長期鞘內置管後，對雄性 Wistar 大鼠後肢的脛附關節處注射卡拉膠（300ug/30ul）以產生機械性超敏。在注射卡拉膠三小時後，鞘內注射配體。使用動態觸覺測定儀來評估機械閾值。

結果：2-AG (1-200 μg) 和 花生四烯酸乙醇胺 (10-200 μg)劑量依賴性降低卡拉膠介導的機械痛覺超敏，而 HP 在較寬的劑量範圍內（0.3-30 μg）沒有鎮痛作用。2-AG 的作用可使用 CB1 受體拮抗劑 AM251 拮抗，而非 CB2 受體拮抗劑 SSR144528-2。HP（3 and 30 μg）同樣也抑制 2-AG 的作用。所有配體都不影響水腫的程度。

結論：HP 後處理對機械痛覺超敏沒有作用，而鞘內注入 2-AG 和 anandamide 對此有效。

（滕淩雅 譯 陳傑 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.

簡報：採用弱磁場處理重比重利多卡因，：一項初步研究

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

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麻醉平面過高是椎管內麻醉潛在可能致命的併發症，每 1000 例病例發生率爲 0.6。目前的預防方法包括減少局部麻醉藥物的劑量和改變病人的體位元，如此方式使腦脊液中重比重麻醉藥物的位置可通過重力作用進行調節。將一種帶磁性流體加入局麻溶液中，在體外脊椎模型中聯合一個外部磁場，可以抗重力地控制帶磁性流體，染料和局部麻醉的位置，此法提示利用另一作用機制，麻醉者能預防麻醉平面過高。

（孫曉瓊 譯 陳傑 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.

術前脈壓和下肢血管搭橋術後較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：已有研究發現術前高脈壓（PP）是冠脈搭橋術後較大的心血管不良事件（MACEs）的一個預測因數。在本研究中，我們評估了在因外周血管疾病行下肢血管搭橋手術的病人，術前高 PP 對於鑒別 MACEs 的預測能力。

方法：我們通過在我們機構預先收集的血管手術的資料庫確定了 412 名在 2003 年 1 月至 2004 年 12 月之間行下肢血管搭橋手術的病人。記錄術前統計學資料包括合併症、使用藥物、術中情況以及術後 MACEs 的發生（心肌梗死、充血性心力衰竭、中風以及院內死

亡）。PP 數值作爲連續分類變數（PP <80 或≥80 mm Hg）來檢驗術後 MACs 的預測能力。建立最終的對數回歸來評估 PP 的預測能力。

結果：PP<80mmHg 組病人 5.7%出現 MACEs，而 PP ≥80 mm Hg 組爲 8.8%（*P*=0.229）。發生 MACEs 病人年齡更大（76 ± 10 歲比 68 ± 12 歲；*P* = 0.001），有心肌梗死病史（9%比 4%；*P* = 0.049），術前 PP 較高（75 ± 19 mm Hg 比 71 ± 21 mm Hg；*P* = 0.306)。在最終的對數回歸模型中，只有年齡是 MACEs 的預測因數（優勢比 1.062；95%置信區間 1.02–1.10；*P* = 0.02）。PP ≥80 mm Hg 和 MACEs 的發生率之間沒有關係（優勢比 1.36，95%置信區間 0.62–2.90; *P* = 0.44）。

結論：對於行下肢血管再通手術病人，術前高 PP 不是心血管不良事件的預測因數。

（安光惠 譯 馬皓琳 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型受體抑制引起試驗性膿毒症動物在麻醉誘導期間的癲癇發作

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

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我們報導了用大麻素 I 型受體（CB1R）拮抗劑對試驗性的膿毒症進行處理的動物在麻醉誘導中的癲癇發作。先給動物行升結腸擴張支架腹膜炎誘發膿毒症或行假手術，然後用 CB1R 拮抗劑、CB1R 激動劑或安慰劑處理。14 小時後，給予動物們戊巴比妥或氯胺酮行麻醉誘導，並觀察了其行爲學改變。12 例由 CB1R 拮抗劑處理的膿毒症動物在戊巴比妥麻醉誘導後有 5 例出現強直陣攣性癲癇發作。資料顯示，CB1R 抑制與戊巴比妥聯合使用可能增加了膿毒症病例在麻醉藥誘導癲癇發作的發生率。

（毛祖旻 譯　李士通 馬皓琳 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.

多個儲液器增加術中細菌傳染

Multiple Reservoirs Contribute to Intraoperative Bacterial Transmission

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背景：術中活塞污染是一個與增加患者死亡率相關的常見事件。本研究中筆者檢測麻醉提供者的手、患者、患者環境對活塞污染的相對貢獻。筆者的次要目的是確定活塞污染的風險因素並檢測活塞污染與術後 30 天感染和死亡率的優先關係。進行額外的微生物學分析以確定術中細菌的儲液器中細菌病原體的傳播。脈衝場凝膠電泳用於評估儲液器細菌病原學對術後 30 天細菌感染的貢獻。

方法：在本多中心研究中，在 274 間手術室中觀察活塞傳染事件，以每個手術室每天的第一和第二例手術爲研究序列以確定案例中和案例間的傳播案例。對儲液器進行細菌培養，並與活塞設備隔離群相比較，以明確活塞閥污染的來源。案例間傳播的定義是由後續案例（案例 2）的活塞設備獲得一個或多個菌株的分離，該菌株和前面案例（案例 1）儲液器菌株完全相同。案例內傳播定義爲從活塞設備獲得的 1 個或多個細菌菌株的分離，與同一案例的細菌儲液罐完全相同。鑒定這些儲液罐中的細菌病原體，並評估它們對術後感染的潛在貢獻。所有患者隨訪術後 30 天的感染進展和全因死亡。

結果：檢測到活塞污染發生率爲 23%（548 例中的 126 例），證實了 14 例案例間和 30 例案例內傳播事件。 所有的 3 個儲液器對案例間（64%環境，14%患者和 21%提供者）和案例內（47%環境，23%患者和 30%提供者）的活塞污染有貢獻。環境是一個與提供者的手（相對風險[RR]爲 1.91，置信區間[CI]爲 1.09 至 3.35，*P*= 0.029）或患者（RR =2.56，CI 爲 1.34 至 4.89，*P* = 0.002）相比更可能的活塞污染源。醫院地點（優勢比[OR]爲 5.09，CI 爲 2.02 至 12.86，*P* = 0.001）和案例 2（OR6.82，CI 爲 4.03 至 11.5，*P* <0.001）是活塞污染的顯著預測因數。活塞污染和死亡率的增加相關（OR 爲 58.5，CI 爲 2.32 至 1477，P=0.014）。術中患者和提供者手的細菌污染和術後 30 天感染發生相關。

結論：患者、提供者的手和環境的細菌污染促成了活塞傳染事件，但患者周圍環境是更可能的來源。活塞污染和患者死亡率增高相關。患者和供應者細菌儲液器促成術後 30 天感染。旨在針對這些儲液器的平行多模式專案應當作爲一個全面減少術中細菌傳播的方法被充分研究。

（許辛譯 馬皓琳 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.

青少年患者在單次術後鼻內給藥後酮咯酸的藥代動力學

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

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背景：給予酮咯酸氨丁三醇（酮咯酸）可減少術後阿片類藥物的需求。對兒童鼻內給予酮咯酸氨丁三醇的藥代動力學特徵尚未研究過。本研究的目的是確定青少年患者鼻內單個劑量的酮咯酸的藥代動力學。

方法：錄入 20 例年齡 12~17 歲的手術患者。術後用專用的給藥系統給予患者鼻內酮咯酸 15mg（體重≤50 kg）或 30mg（體重>50 kg）。在給藥前 15min 內（基礎值）及給藥後 1、2、3、4、6、8、12 和 24 小時獲得血樣用於酮咯酸含量測定。用非線性混合效應模型進行人群分析。將參數估計標準化到 70kg 的人。

結果：青少年鼻內給藥能很好地耐受，不良反應極小。有一級吸收和排除的單室模型能令人滿意地描述時間－濃度特性。人群參數估計（個體差異）爲清除率（CL/F）2.05 L/h（60.5%）、分佈容積（V/F）15.2L（32.4%）、吸收半衰期（$t_{1/2}$abs）0.173 h（25.0%）。達到濃度峰值的時間爲 52 min（SD 6 min）。

結論：通過鼻內途徑給予酮咯酸使血漿濃度快速升高，對於青少年可能是靜脈內注射的有用治療替代，因爲通過此裝置達到的血漿濃度很可能是有鎮痛作用的（研究用新藥編號 62,829）。

（馬皓琳 譯 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).

動脈內注射維拉帕米治療腦血管痙攣後的血流動力學穩定性

Hemodynamic Stability After Intraarterial Injection of Verapamil for Cerebral Vasospasm

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背景:血管痙攣是蛛網膜下腔出血後一項常見並可能威脅生命的併發症。血管痙攣的治療包括動脈內注射維拉帕米使其進入大腦血管系統。根據臨床經驗，動脈內注射維拉帕米後

多數病人會出現收縮壓急劇降低。我們研究的目的是(1)確認動脈內注射維拉帕米對腦血管痙攣病人平均動脈壓（MAP）和心率（HR）的影響；（2）確定不同維拉帕米劑量對平均動脈壓和心率變化的影響。我們假設（1）選擇性的動脈內注射維拉帕米治療腦動脈血管痙攣與平均動脈壓降低和心率增快有關，（2）平均動脈壓和心率的變化與使用的維拉帕米劑量呈線性相關。

方法:我們預先研究了患有血管痙攣需行腦血管造影術且可能行動脈內注射維拉帕米治療的病例。所有病例均給予一個全身麻醉藥。術中連續監測動脈有創血壓和心率，並且每隔 10 秒記錄資料。我們鑒定了注射維拉帕米前後最低平均動脈壓和最快心率。用重複計量多元回歸分析確定動脈內注射維拉帕米與平均動脈壓和心率的變化之間的相關性，並調整潛在混雜因素（體重，術前升壓藥的使用和注射前平均動脈壓）。以修正係數和 95%可信區間形式報導資料。

結果：我們收錄了 20 個病例，共行 46 次動脈內注射維拉帕米。在我們的多變數模型基礎上，我們觀察到每次動脈內注射 5mg 維拉帕米，平均動脈壓平均下降 3.5mmHg(95% CI −5.0～ −2.0, $P < 0.001$)。動脈內注射維拉帕米後無論經未校準分析還是校準分析後顯示心率均無顯著性變化（每次動脈內注射 5mg 維拉帕米，心率無顯著意義地增加 0.4 次/分，95% CI −1.6～2.4, $P = 0.70$）。

結論：全麻下，動脈內注射維拉帕米使其進入腦內動脈能降低平均動脈壓但是通常的患者心率無變化。需行進一步研究以確定這些結果的臨床意義。

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.

運動訓練減輕大鼠坐骨神經慢性縮窄性損傷後的神經性疼痛和細胞因數表達

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

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背景：運動對神經性疼痛造成影響的關鍵機制仍然不是很清楚。我們研究了體育鍛煉是否可以調節坐骨神經慢性縮窄性損傷後的功能恢復以及熱休克蛋白 72 (Hsp72)、腫瘤壞死因數-α(TNF-α) 和白細胞介素-1β(IL-1β)的表達。

方法：雄性 SD 大鼠被分爲 7 組，分別爲：對照組、假手術組(SO)、進行游泳或踏車運動的假手術組(SOSE 或 SOTE)、慢性縮窄性損傷組（CCI），進行游泳或踏車運動的 CCI 組(CCISE 或 CCITE)。我們記錄了體重、熱縮足反射潛伏期和機械刺激縮足閾值，同時還記錄了 Hsp72、TNF-α 和 IL-1β 在坐骨神經中的表達。

結果：對照組和 SO 組大鼠的體重比 SOSE、SOTE、CCI、CCISE 和 CCITE 組大鼠的體重要重。在慢性縮窄性損傷後的第 21 天，進行游泳或踏車運動的 CCI 組大鼠的熱縮足反射潛伏期和機械刺激縮足閾值明顯比沒有運動的 CCI 組大鼠的要長。在慢性縮窄性損傷後的第 21 天，CCISE 和 CCITE 組大鼠的坐骨神經的 Hsp72 表達比 CCI 組高，而 TNF-α 或 IL-1β 水準比 CCI 組低。

結論：這些結果表明，漸進式的運動訓練可以減輕坐骨神經慢性縮窄性損傷後的周圍神經性疼痛，同時減少 TNF-α 和 IL-1β 的過度表達，並增加 HSP72 的表達。

（張怡 譯 馬皓琳 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.

大鼠鞘內注射阿替美唑可增加嗎啡的鎮痛作用

Intrathecal Atipamezole Augments the Antinociceptive Effect of Morphine in Rats

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背景：阿片類鎮痛藥對治療慢性疼痛有效，但存在嚴重不良反應，比如產生耐藥性和依賴性。α_2腎上腺素激動劑和μ阿片受體激動劑在脊髓鎮痛中有協同增強和交叉耐受作用，而α_2腎上腺素拮抗劑有引起傷害感受的作用。然而，有文獻報導，蛛網膜下腔內給予超低劑量的α_2腎上腺素拮抗劑反而能促進阿片類藥物的鎮痛作用。新的資料提示，功能性μ阿片-α_2腎上腺素能受體複合物一說可能有助於解釋α_2腎上腺素拮抗劑的這一神奇效應。本研究評估了低劑量阿替美唑（一種非選擇性α_2腎上腺素拮抗劑）對全身性和椎管內注射嗎啡的鎮痛作用和耐受性的影響。

方法：在雄性 S-D 大鼠用熱板試驗、甩尾試驗和壓痛試驗評估鎮痛效果。誘導全身性和脊髓阿片耐受 4 天。研究鞘內和皮下注射阿替美唑對嗎啡介導的急性鎮痛作用和既有嗎啡耐受的影響。

結果：全身性和椎管內注射研究劑量（皮下注射 0.03、0.3、3μg/kg 或鞘內注射 0.1、1、10ng）的阿替美唑本身並不產生鎮痛作用。甩尾試驗提示，鞘內聯合應用嗎啡和 1ng 阿替美唑在給予試驗用藥後 30 分鐘可增加急性脊髓嗎啡的鎮痛作用。此外，甩尾試驗還提示鞘內注射 10ng 阿替美唑在給予試驗用藥後 30 分鐘可減少之前建立的嗎啡耐受。但皮下注射阿替美唑對嗎啡的全身鎮痛作用無明顯影響，也不減少嗎啡耐受。

結論：椎管內同時聯合應用低劑量阿替美唑，可增強嗎啡對未做過試驗的大鼠和嗎啡耐受大鼠的鎮痛作用。μ阿片受體和α_{2A}腎上腺素受體形成異二聚體導致的功能上的改變和交

互作用可解釋這些結果。這也爲應激狀態下或其他因素（如藥物）導致去甲腎上腺素能緊張度增加的患者對阿片類藥物反應的變異性和耐藥性提供了有趣的解釋。

（陳彬彬 翻譯， 馬皓琳 李士通審校）

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 α_2 agonists and μ-opioid receptor agonists show synergistic potentiation and cross-tolerance in spinal analgesia, whereas α_2-adrenergic antagonists have shown pronociceptive effects. However, at ultralow doses, spinal α_2-adrenergic antagonists have been reported to paradoxically enhance opioid antinociception. New data have suggested a functional μ-opioid-α_2-adrenoceptor complex, which may help in interpreting the paradoxical effect of the α_2-adrenergic antagonists. In the present study we assessed the effects of low doses of atipamezole, a nonselective α_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 α_{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 因數和氨甲環酸而非重組 VIIa 因數可以減弱組織型纖溶酶原啓動物介導的纖溶亢進

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：纖溶亢進是一種因爲凝血因數和血小板消耗進而出血的病理狀況。而 XIII 因數及凝血酶啓動的纖溶抑制物在保護血塊被溶解方面扮演的重要角色。我們實驗假設 XIII 因數的濃度、凝血原複合物的濃度、重組凝血因數 VIIa 及氨甲環酸對纖溶都有一定程度的抑制和血小板有助於抗纖維蛋白溶解作用。

方法：采自13名健康志願者的枸鹽酸化全血樣本，加入重組組織型纖溶酶原啓動物的濃度（最終溶度爲 100 ng ·mL^{-1}）使血液發生纖溶亢進。爲了評估纖溶抑制情況，所有試驗分別分爲 FXIII-A_2B_2 試劑組(0.42 U ·mL^{-1})、PCC 試劑組 (0.42 U ·mL^{-1})、rFVIIa 試劑 組 (最終濃度: 1.6 μg · mL^{-1})、TA 試劑組 (最終濃度 0.33 mg ·mL^{-1}),及生理鹽水空白組.。 經過45至60分鐘的體外啓動實驗後 ，再用旋轉血栓彈性測定法分析凝血功能。此外，通過添加細胞鬆弛素 D 以此來檢測在無血小板作用時，血凝塊的形成情況。

結果：由重組組織型纖溶酶原啓動物誘發的纖溶組（CLI 爲45時： 中值爲 78%; 72/85.5, 25th/75th 百分數），FXIII 組(90%; 82.5/96, *P* = 0.025), PCC 組 (89%; 74/91, *P* = 0.0465), 及 TA 組(94%; 92/96, *P* = 0.001) ，而 rFVIIa 組爲(79%; 72/86.5, *P* = 1.0) 顯然對 CLI 減少很小；同樣 CLI 爲60時， 出現增加的組爲 FXIII 組爲 (66%; 33/90.5, *P* = 0.017) 和 TA 組爲 (90%; 89/92, *P* = 0.001) ， 相對比 r-tPA 空白組爲(21%; 7/59)。在用細胞鬆弛素 D 減弱血小板功能後， 明顯增加是 TA 爲(95%; 89/97.5, *P* = 0.0025) 和 PCC 爲(84%; 70.5/90, *P* = 0.0305) 而 FXIII 及 rFVIIa 在 CLI45 and CLI60爲 (TA: 89%; 84.5/96, *P* = 0.01 ，PCC: 55%; 29.5/60, *P* = 0.0405) ， 相對比 r-tPA 空白組爲(CLI45: 59%; 40.5/72.5 ，CLI60: 10%; 0/30)

結論：在用全血樣本血栓彈力測量實驗中，僅僅氨甲環酸，纖維蛋白穩定因數（XIII 因數）和凝血酶原複合物明顯抑制重組組織型纖溶酶原啓動物誘發的纖溶亢進活動，而 rFVIIa 則沒有此作用。同樣，我們發現外源的 FXIII 起作用需要依靠有功能的血小板參與

(鄧利兵譯 薛張綱校)

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 ·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 ·mL^{-1}), PCC (0.42 U ·mL^{-1}), rFVIIa (final concentration: 1.6 μg · mL^{-1}), TA (final concentration: 0.33 mg ·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.

可變性的反應是減少當一異丙酚臨床觀察是納入控制:一項模擬研究

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：當使用血漿靶控輸注異丙酚產生鎮靜作用時，操作者假設病人個體的藥代動力學參數與控制系統相匹配以達到特定的效應室靶濃度，並且特定的靶濃度適用于病人個體的敏感性。這些不準確的級聯系統在達到要求的鎮靜深度中產生了錯誤，稱之爲“目標錯誤”。爲了處理這樣的問題，我們設計了一個整合了操作者觀察反應性缺失來確定病人敏感性的控制系統。我們假設這個控制系統可以減少藥代動力學錯誤的影響和敏感性在系統目標錯誤的不確定性。

方法：實現了一個新穎的控制系統在反應性缺失的可能性中能產生一個緩慢的過渡，爲操作者提供更大的分辨度觀察這個過渡時間。該系統利用這個過渡時間來推斷效應室濃度與反應性缺失相關，並且持續輸注需要保持這個濃度。我們針對異丙酚用電腦類比生成了 10,000 例藥代動力學參數和敏感性隨機分佈的病人，並比較了我們系統的目標錯誤與達到相關 50%可能反應性缺失的效應室濃度的靶控輸注系統。

結果：我們的系統表現出−0.75%±8.96%的目標錯誤，相比之下靶控輸注系統是 0%±27.6%，在達到特定靶濃度的變異性與靶控輸注系統相比減少了 3.1 倍，P < 0.0001 有統計學意義。

結論：我們的系統能降低包括操縱系統中操作者在內的生物變異性的影響。這種方法的實用性在臨床實踐中需要進一步評估。

（方昕譯 薛張綱校）

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.

肺葉切除術後的急性腎損傷:發病率及圍術期高危因素

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

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背景：術後急性腎損傷(AKI)發生在多種手術中，它與圍術期患者發病率和死亡率相關。但我們對於肺葉切除術後的 AKI 發生沒有進行充分的研究。在本次研究中，我們確認了術後 AKI 的發病率、高危因素以及術後 AKI 與肺葉切除術患者預後的關係。

方法：我們自2006年1月至2010年3月在三級監護學術中心對接受肺葉切除的患者進行了回顧性的觀察研究。術後 AKI 的診斷建立在術後72小時急性腎損傷網（AKIN）肌酐標準。我們使用邏輯回歸模型來確立圍術期因素與術後72小時 AKI 風險之間的關係。我們還研究了術後 AKI 與患者預後（包括死亡率、住院天數以及再次插管的需求）間的關係。

結果：共1129位患者（其中全肺切除 n=71，二葉切除術 n=30，一葉切除術 n=580，肺段切除術 n=35，楔形切除術/肺大皰切除術 n=413）包含在最終的分析報告中。患者平均年齡61歲(SD 15)，50%是女性患者，其中67位患者(5.9%）基於 AKIN 肌酐標準術後72小時診斷爲 AKI（第一級，n=59；第二級，n=8；第三級，n=0），僅有一名患者需要腎臟替代治療。多變數分析顯示術後 AKI 與下列因素存在獨立關係：高血壓（調整比值[OR]2.0，95%可信區間[CI]：1.1—3.8），周圍血管疾病（OR 4.4，95% CI：1.8—10），腎小球濾過率（OR 2.2，95% CI：0.69—0.93），術前使用血管緊張素 II 受體阻滯劑（OR 2.2，95% CI：1.1—4.4），術中使用羥乙基澱粉管理（OR 1.5，95% CI：1.1—4.4），以及胸腔鏡操作（對比開放手術）（OR 0.37，95% CI：0.15—0.90）。根據 AKI 的進展程度可引起下列相關結果：再插管率的增加（12% vs 2%，P<0.001），術後機械通氣率增加（15% vs 3%，P<0.001），以及住院時間的增加（10天 vs 8天，P<0.001）。兩組病人的死亡率沒有明顯區別（3% vs 1%，P=0.12）。

結論：肺葉切除術後 AKI 的術前危險因素與已知的其他手術相同。圍術期的管理看上去似乎影響了肺葉切除術後 AKI 的發生；特別是使用合成膠體可能會增加 AKI 的風險，而胸腔鏡操作可能可以降低 AKI 的風險。術後早期 AKI 與呼吸併發症和住院時間的延長相關。

（郭晨躍譯 薛張綱校）

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.

食管多普勒對兒童腎臟動脈血流速度和血流指數測量

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

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背景: 多普勒源性的腎臟血流指數已經被用來評估腎臟病理。然而，經食道超聲（TEE）還沒有被用來評估兒科患者的腎變數。在這項研究中，我們（a）評估是否經食道超聲（TEE）能使腎實質和腎動脈足夠的視覺化，及（b）評估在兒童中經食道超聲（TEE）源性的腎血流測量/指數與經典的經腹腎超聲(TAU)的一致性。

方法：前瞻性佇列研究納入 28 例 1 歲和 17 歲之間的健康兒童，沒有已知的腎功能不全，他們正在心導管實驗室進行房間隔缺損設備封堵。TEE 是用來獲取多普勒腎動脈血流速度（收縮期峰值流速，舒張末流速，平均舒張速度，阻力指數，搏動指數），同時這些測量用來與經腹腎超聲(TAU)獲得的測量進行比較。一致性相關係數（CCC）用來確定兩種方法臨床上的顯著一致性。布蘭德 - 奧特曼曲線被用來確定是否同意這兩種方法是否具有充分互換使用性。P≤0.05 被認爲具有統計學意義。

結果：在兒童中通過 TEE 獲得腎實質二維圖像和多普勒源性的測量是可行的。對於所有測量來說兩種方法具有統計學意義的一致性。兩種圖像技術的一致性相關係數（CCC）對於搏動指數是 0.91，對於阻力指數爲 0.66。這些係數對於異常值是敏感的。當把最高和最低的資料點從分析中刪除，兩種圖像技術的一致性相關係數（CCC）對於搏動指數是 0.62，對於阻力指數爲 0.50。搏動指數（CI）的 95%可信區間爲 0.35 至 0.98，阻力指數的爲 0.21 至 0.89。布蘭德 - 奧特曼曲線表明 2 種方法之間具有很好的一致性；對於搏動指數，一致性的範圍爲-0.80 到 0.53。兩種方法在測量大小與平均差之間(-0.14; 95% CI = -

0.28, 0.01)的相關性上沒有統計學差異(r = 0.31, P = 0.17)。阻力指數，一致性的限制分別爲-0.22 至 0.12。測量大小與方法的平均差異的相關性上沒有統計學差異(r = 0.10, P = 0.65)。

結論：這項研究證實了在兒童中用 TEE 獲取腎實質二維圖像和多普勒源性測量的可行性。 角度獨立食道多普勒衍生指數同 TAU 獲得的資料比較具有顯著的一致性。評估這種相關性是否持有腎臟病理存在的真實性上需要進一步的研究。這種技術對於根據腎變數的影響而說明調節術中干預是有潛力的，並可能證明在圍術期兒童急性腎損傷的風險評估上是有用的。

(李麗紅譯 薛張綱校)

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 $P \leqslant 0.05$.

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.

醫學類情報的文章：關於診斷或者術後喉部呼吸的通氣

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

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診斷過程或者手術後予以鎮靜對於喉部呼吸者包括喉切除病人都是一大挑戰。不幸的是，大多數的醫療工作者包括護士，醫技人員，外科醫生，還有麻醉醫生對喉切除患者的術前、術中、術後的解剖並不關心。病人是如何說話，術後如何管理他們的氣道。促進這些的方法需要討論。教育醫務人員有關這些組織的解剖能夠更好地照顧這類病人。

（孫莉萍譯 薛張綱校）

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.

控制術後疼痛的新方法：在大鼠術後疼痛模型上植入長效鎮痛凝膠

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：非甾體類抗炎藥是目前最常用於術後鎮痛的非阿片類藥物。本實驗中我們檢測了大鼠術後疼痛模型上植入可降解水凝膠釋放的酮洛芬的持續鎮痛效果。

方法：將一塊鎮痛藥浸潤的水凝膠在手術結束時植入大鼠的蹠肌下。用馮弗雷纖維測試術前和術後兩周機械刺激的縮足反射閾值。酮洛芬的術後鎮痛效果以免疫組化結果評估，通過免疫組化檢測脊髓內神經膠質細胞啓動及 OX-42 和磷酸化 p38MAPK 表達。

結果：術後一周，植入酮洛芬浸潤的水凝膠組表現出持續鎮痛作用。另一種用於超前鎮痛的非甾體類抗炎藥紮托洛芬，與酮洛芬浸潤的水凝膠發揮協同作用，表現出更強的鎮痛效果。術後第三天，植入酮洛芬水凝膠組的神經膠質細胞啓動減弱。

結論：酮洛芬在大鼠術後疼痛模型上一周內降低機械刺激高敏反應是有效的。植入非甾體類抗炎藥浸潤的水凝膠可作爲術後長期鎮痛的一種有效方法。

（郁玲玲譯 薛張綱校）

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.

減少外周神經阻滯中局部麻醉藥的鈉含量：生理鹽水和 5%葡萄糖的比較評價—— 一項隨機雙盲對照試驗

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藥是用生理鹽水稀釋而製成，具有較高的鈉含量。已有研究暗示，神經周圍的鈉濃度高時，能通過阻止和/或延緩神經阻滯從而拮抗局部麻醉劑的鎮痛效果。目前還沒有相關報導稱 5%葡萄糖注射在神經組織周圍時會造成任何短期或長期的傷害。在這項研究中，我們前瞻性地比較和評估了用這兩種溶劑稀釋局麻藥時的阻滯特性。

方法：準備行上肢手術的患者隨機分組，用 0.5%羅哌卡因（1%羅哌卡因用 5%葡萄糖或生理鹽水進行稀釋）行腋路臂叢神經阻滯。每 5 分鐘行運動和感覺阻滯的測試，共進行 30 分鐘。術後 24 小時和 7 天進行電話隨訪，術後 3 天、10 天和/或 14 天至 28 天外科隨訪時記錄副作用、病人的滿意度、阻滯消失的時間。有任何神經損傷時則隨訪至消失。主要結果是感覺神經阻滯的起效時間。

結果：這項研究共招募了五百五十例患者。葡萄糖組的完全感覺阻滯的平均時間爲 18.3±6.1 分鐘，生理鹽水組爲 22.5±6.4 分鐘（P<0.001，95%置信區間的平均差異 3.0-5.4 分鐘）。5 例患者發生臨床上的神經損傷（組間無統計學差異）。

結論：用 5%葡萄糖稀釋的羅哌卡因在腋路臂叢神經阻滯中起效較早。

（周玲譯 薛張綱校）

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.