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超聲引導下的肌間溝臂叢神經阻滯中 **1.5%**甲呱卡因和 **0.5%**布比卡因的注入順序不會影響阻滯起效的潛伏時間及鎮痛的持續時間

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綜述：補體的活化與心臟手術：改善預後的一種新靶點

Review Article: Complement Activation and Cardiac Surgery: A Novel Target for Improving Outcomes

Gregory L. Stahl, PhD*, Stanton K. Shernan, MD*, Peter K. Smith, MD† and Jerrold H. Levy, MD‡
From the *Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, MA; †Department of Surgery, Division of Cardiovascular and Thoracic Surgery, Duke University, Durham, NC; , ‡Cardiothoracic Anesthesiology and Critical Care, Emory University School of Medicine, Atlanta, GA.
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補體活化和繼發的炎症反應是心臟手術中多系統器官損傷的一種重要的潛在機制。採用補體抑制劑這種新的治療策略，可能有希望通過抑制補體活化或其生物活性的效應分子來改善心臟手術患者的預後。最近有研究補體抑制劑的臨床試驗爲進一步描述補體活化及其抑制作用對臨床預後的影響提供了重要資料。此綜述檢視了補體活化和其抑制作用作爲一種治療手段在心臟手術中的地位。
（馬霄雯　譯　陳傑　校）
Complement activation and the resulting inflammatory response is an important potential mechanism for multisystem organ injury in cardiac surgery. Novel therapeutic strategies using complement inhibitors may hold promise for improving outcomes for cardiac surgical patients by attenuating complement activation or its biologically active effector molecules. Recent clinical trials evaluating complement inhibitors have provided important data to further delineate the impact of complement activation and its inhibition on clinical outcomes. In this review we examine the role of complement activation and its inhibition as a therapeutic approach in cardiac surgery.

在長期鞘內注射嗎啡人群中嗎啡及代謝產物在腦脊液和血漿的分佈特徵

Characteristics of Distribution of Morphine and Metabolites in Cerebrospinal Fluid and Plasma with Chronic Intrathecal Morphine Infusion in Humans

Mark Wallace, MD and Tony L. Yaksh, PhD
From the Department of Anesthesiology, University of California—San Diego, La Jolla, CA.
Anesth Analg October 2012 115:797-804;

背景：儘管長期鞘內注射嗎啡被廣泛應用，但是很少有系統性工作評估長期鞘內注射嗎啡後期穩態濃度或腦脊液的化學變化。因此本實驗研究了長期接受嗎啡鞘內注射的患者的上述問題。
方法：置管和埋泵（範圍：127 到 2165 天）並接受固定劑量（>1 周）鞘內注射嗎啡的疼痛患者被納入實驗。按以下順序進行操作：（1）估計疼痛評分；（2）X 光片確定導管尖端的位置；（3）在腰椎 L4-L5 或 L5-S1 間隙穿刺取腦脊液樣本。腦脊液和血漿樣本用於

化學檢驗，用液相色譜-質譜分析儀檢測嗎啡及其 3/6 葡萄糖苷酸代謝產物（M3G，M6G）。

結果：19 例病人入組。其中獲得 16 例病例的腦脊液樣本。三例病人無法進行原始資料分析，因爲一例置管於硬膜外，一例導管斷裂，另一例導管尖端形成肉芽腫。剩餘 13 例病人的每日劑量範圍，泵速和濃度分別爲 1.6-25mg/d， 0.1-1ml/d， 5-50mg/ml。主要的觀察報告如下：（1）血漿和腦脊液中的嗎啡，M3G 和 M6G 與每日劑量呈顯著的（線性）回歸斜率關係；（2）相反，腦脊液和血漿中嗎啡比率：M3G：M6G 與每日劑量相關的回歸斜率值和 0 值相比無差異；（3）繪製出的標準化腦脊液嗎啡濃度（例如每日鞘內注射嗎啡的注射部位濃度）和取樣位置與導管尖端相差幾個節段的腦脊液中的嗎啡濃度相比明顯下降；但差異並非因距離導致的結合物產生（4）腦脊液蛋白，葡萄糖，紅細胞白細胞計數相對每日嗎啡劑量或採樣點嗎啡濃度提示無顯著回歸關係；（5）置管失敗或形成肉芽腫的病人的腦脊液中嗎啡濃度降低。

結論：長期注射嗎啡導致其在腦脊液中呈高濃度聚集，濃度與輸注劑量和採樣點距輸注點距離相關，但對腦脊液生化無影響。

（王苑　譯　陳傑　校）

BACKGROUND: Despite widespread use of chronic intrathecal (IT) infusions of morphine, there is little systematic human work evaluating the steady state morphine concentrations or cerebrospinal (CSF) chemistry after long-term IT morphine delivery. We sought to address these issues in patients receiving chronic IT morphine infusion.

METHODS: Pain patients with implanted catheters and pumps (range: 127 to 2165 days), receiving a stable dosing (>1 week) of IT morphine by infusion, were entered into the study. The following sequence was performed: (1) estimation of pain score; (2) radiograph localization of catheter tip; (3) percutaneous sampling of lumbar CSF at the L4 to 5 or L5–S1 space. CSF/plasma samples were assayed for chemistry, and morphine and its 3/6 glucuronide metabolites (M3G, M6G) by liquid chromatography mass spectrometry.

RESULTS: Nineteen patients were enrolled. CSF samples were obtained from 16 subjects. Three patients were not included in the primary analysis because 1 catheter was epidural, 1 catheter was fractured, and 1 had a granuloma at the catheter tip. Of the 13 sampled patients, the range of daily doses, rates, and concentrations were 1.6 to 25 mg/d and 0.1 to 1 mL/d, 5 to 50 mg/mL, respectively. The principal observations were as follows: (i) morphine, M3G, and M6G were present in the CSF and plasma and showed a significant regression slope when plotted versus daily dose; (ii) in contrast, the regression slope of the group ratio morphine:M3G:M6G plotted versus daily dose in CSF or plasma was not different from zero; (iii) plotting "normalized" CSF analyte concentration (e.g., concentration at site/daily IT morphine dose) against the segmental distance of the sampling site from the catheter tip revealed a significant decline in concentration of morphine, but not of conjugates as a function of distance from the catheter tip; (iv) plotting CSF protein, glucose, and red and white cell counts versus daily morphine dose or morphine concentration at the sampling site revealed no significant regression; and (v) patients with a catheter failure or a granuloma showed reduced concentrations of morphine in their CSF.

CONCLUSION: Chronic infusion of morphine shows high concentrations, which correlate with the infusion dose and the proximity of the sampling site to the infusion site with no effects on CSF chemistry.

在病態肥胖患者中使用兩種藥代模型以總體重計算的誘導及插管所需丙泊酚的效應有效濃度

The Effective Effect-Site Propofol Concentration for Induction and Intubation with Two Pharmacokinetic Models in Morbidly Obese Patients Using Total Body Weight

Ghislaine C. Echevarría, MD, MSc, María F. Elgueta, MD, María T. Donoso, MD, Diego A. Bugedo, MD, Luis I. Cortínez, MD and Hernán R. Muñoz, MD, MSc
From the Departamento de Anestesiología, Escuela de Medicina, Pontificia Universidad Católica de Chile, Santiago, Chile.
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背景：大部分丙泊酚輸注的藥代動力學（PK）模型是基於正常體重患者研究之 上的。這些模型推廣使用于病態肥胖患者存在爭議。利用兩個藥代動力學模型和靶控輸注系統，作者擬確定在病態肥胖者中以總體重計算的麻醉誘導所需要的預計丙泊酚效應部位濃度（Ce）

方法：66 名從 18 到 50 歲的病態肥胖受試者隨機接受基於 Marsh 或 Schnider 藥代模型的丙泊酚輸注，以達到並維持預定丙泊酚效應部位濃度。對所有受試者進行腦電雙頻指數監測。輸注丙泊酚前使用芬太尼 3μg/kg。意識喪失後注射維庫溴銨便於氣管插管。每組 6 名患者 爲接受不同預定效應濃度的丙泊酚。 丙泊酚“有效濃度”（ECe）定義爲整個誘導期（從達到預測目標濃度 45 秒後，至氣管插管後 5 分鐘）維持足夠催眠狀態（雙頻指數 <60）。研究期間每分鐘測量心率和動脈血壓。使用 Probit 回歸分析來計算使 50%、95% 患者進入催眠狀態的有效丙泊酚效應濃度（ECe_{50}和 ECe_{95}）和 95%置信區間（CIs）。

結果：各模型組及不同丙泊酚效應濃度組之間患者特徵具有可比性。Marsh 模型和 Schnider 模型計算得到的 ECe_{50} 分別爲 3.4μg/mL（95%CI：2.9，3.7μg/mL），4.5μg/mL（95%CI：3.8，6.2μg/mL）。而兩者計算得到的 ECe_{95} 分別爲 4.2μg/mL（95%CI：3.8，6.2μg/mL）和 5.5μg/mL（95%CI：5.0，7.2μg/mL）。達到 ECe_{95} 時兩 PK 模型的血流動力學相似。

結論：使用總體重計算病態肥胖患者誘導所需丙泊酚劑量時，應考慮到各 PK 模型目標濃度的差異。

（孫莉荔　譯　陳傑　校）

BACKGROUND: Most pharmacokinetic (PK) models used for propofol administration are based on studies in normal-weight patients. Extrapolation of these models for morbidly obese patients is controversial. Using 2 PK models and a target-controlled infusion system, we determined the predicted propofol effect-site concentration (Ce) needed for induction of anesthesia in morbidly obese subjects using total body weight.

METHODS: Sixty-six morbidly obese subjects from 18 to 50 years of age were randomized to receive propofol to reach and maintain a predetermined propofol Ce, based on the PK models of either Marsh or Schnider. All patients were monitored with a Bispectral Index electroencephalographic monitor. Fentanyl 3 μg/kg total body weight was administered before starting the propofol infusion. After loss of consciousness, vecuronium was administered to facilitate endotracheal intubation. Groups of 6 patients each received propofol at a different, predetermined target propofol Ce. An “effective Ce” (ECe) was defined as the propofol Ce that provided adequate hypnosis (Bispectral Index <60) during the complete induction period (45 seconds after reaching the predetermined target Ce until 5 minutes after tracheal intubation). Heart rate and arterial blood pressure were measured every 1 minute throughout the study period.

Probit regression analysis was performed to calculate the effective propofol Ce values to induce hypnosis in 50% (ECe_{50}) and 95% (ECe_{95}) of patients with 95% confidence intervals (CIs).
RESULTS: Patient characteristics were similar between models and across the propofol target concentration groups. The ECe_{50} of propofol was 3.4 μg/mL (95% CI: 2.9, 3.7 μg/mL) with the Marsh model and 4.5 μg/mL (95% CI: 4.1, 4.8 μg/mL) with the Schnider model ($P < 0.001$). The ECe_{95} values were 4.2 μg/mL (95% CI: 3.8, 6.2 μg/mL) and 5.5 μg/mL (95% CI: 5.0, 7.2 μg/mL) with Marsh and Schnider models, respectively. At the ECe_{95}, hemodynamic effects were similar with the 2 PK models.
CONCLUSION: Different propofol target concentrations for each PK model must be used for induction when using total body weight in morbidly obese patients.

技術交流　一項新的腎臟生理參數：分鐘尿流率變異度

Technical Communication: Minute-to-Minute Urine Flow Rate Variability: A New Renal Physiology Variable

Yoram Klein, MD*, Mor Grinstein, PhD†, Stephen M. Cohn, MD‡, Jacob Silverman, PhD§, Moti Klein, MD〃, Hanoch Kashtan, MD¶ and Micha Y. Shamir, MD#
From the *Department of Acute Care Surgery and Trauma, Kaplan Medical Center, Rehovot, Israel; †Department of Anatomy and Cell Biology, Rappaport Faculty of Medicine, Technion-Israel Institute of Technology, Haifa, Israel; ‡Department of Surgery, University of Texas Health Science Center, San Antonio, Texas; §Department of Chemistry, National Institute of Oceanography, Haifa, Israel; 〃Department of Anesthesia, Intensive Care Unit, Soroka Medical Center, Beer Sheba, Israel; ¶Department of Surgery B, Rabin Medical Center, Petach Tikvah, Israel; and #Department of Anesthesiology, Hadassah–Hebrew University Medical Center, Jerusalem, Israel.
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背景：尿量代表組織灌注，通常以 1 小時爲間隔進行測量。由於少量尿在集尿袋中難以測量，且高估或低估情況較常見。爲了克服這些缺點，出現了電子尿流率儀。因爲這些儀器每隔 1 分鐘測尿量，實現了對尿流率（UFR）的分鐘測量。在前期研究中觀察到 UFR 的分鐘變異度在低血容量時消失。本研究的目的在於闡述分鐘尿流率（UFR)的變異度可作爲一項新的腎臟生理參數，同時研究其與血容量減少的關係。
方法：本研究的實驗動物爲 7 只成年豬。測量容量正常及逐漸失血（占總血容量的 10%，20%，30%）時的尿流率，分鐘尿流率，平均動脈壓，心率及城剩餘。利用方差及小波頻譜分析測量分鐘尿流率變異度的消失。
結果：當失血量占總血容量 10%時，尿流率從 2.2 ± 0.2mL/min 下降至 1.0 ± 0.1 mL/min(標準誤±1, $n = 7$, $P = 0.0348$)。分鐘尿流率的變化從 1.4 ± 0.3 mL/min 下降至 0.4 ± 0.1 mL/min(±1 SE, $n = 7$, $P = 0.046$)。
結論：尿流率及分鐘尿流率的變異度在出血時降低，尿流率的變異度在協助診斷血容量減少時可能有一定幫助。
（諸琳婕　譯　陳傑　校）
BACKGROUND: Urine output is a surrogate for tissue perfusion and is typically measured at 1-hour intervals. Because small urine volumes are difficult to measure in urine collection bags, considerable over- or underestimation is common. To overcome these shortcomings, digital urine meters were developed. Because these monitors measure urine volume in 1-minute intervals,

they provide minute-to-minute measurements of the urine flow rate (UFR). In a previous study, we observed that the minute-to-minute variability in the UFR disappeared during hypovolemia. The aim of this study was to describe the minute-to-minute variability in the UFR as a new physiological variable and to show its relationship to blood volume depletion.
METHODS: Seven adult pigs were used in this study. The UFR, minute-to-minute UFR, mean arterial blood pressure, heart rate, and base excess were measured at euvolemia and during gradual hemorrhaging (10%, 20%, and 30% of estimated blood volume). Variance and wavelet spectral analysis were used to measure the disappearance of the minute-to-minute UFR variability.
RESULTS: The UFR decreased from 2.2 ± 0.2 to 1.0 ± 0.1 mL/min after a 10% estimated blood volume loss (±1 SE, $n = 7$, $P = 0.0348$). The variance in the minute-to-minute UFR decreased from 1.4 ± 0.3 to 0.4 ± 0.1 mL/min (±1 SE, $n = 7$, $P = 0.046$).
CONCLUSIONS: The UFR and its minute-to-minute variability decrease during hemorrhaging. The variability in the UFR may be useful as an aid for the diagnosis of hypovolemia.

琥珀膽鹼在危重病人中使用的局限性

The Limits of Succinylcholine for Critically Ill Patients

Antonia Blanié, MD, Catherine Ract, MD, Pierre-Etienne Leblanc, MD, Gaëlle Cheisson, MD, Olivier Huet, MD, Christian Laplace, MD, Thomas Lopes, MD, Julien Pottecher, MD, Jacques Duranteau, MD, PhD and Bernard Vigué, MD, PhD
From the Département d'Anesthésie-Réanimation, Centre Hospitalier Universitaire Bicêtre, Le Kremlin-Bicêtre, France.
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背景：緊急插管在重症監護室較常見，這種情況下，琥珀膽鹼是神經肌肉阻滯藥中首選之一。因爲存在一個或多個煙鹼受體上調因素，危重病人在給予琥珀膽鹼後有很大的高鉀血症的風險，但真實風險的資料很少。本研究目的是研究與動脈血鉀升高(ΔK)有關的因素和評估在 ICU 中因緊急插管而注射琥珀膽鹼後引起急性高鉀血症≧6.5mmol/l 的發生率。
方法：在此項前瞻性觀察研究中，篩選出所有用琥珀膽鹼來進行氣管插管的危重病人。只對琥珀膽鹼注射前後有動脈血氣和血鉀監測的氣管插管案例進行研究。
結果：18 個月中，總共 153 個插管案例中，有 131 個危重病人在給予琥珀膽鹼進行氣管插管前後有動脈血鉀監測(K_{after})。經多因素分析，與 ΔK 相關的唯一因素是插管前 ICU 停留時間（ρ=0.561，p＜0.01），與 Kafter≧6.5mmol/l（n=11）相關的因素是 ICU 停留時間（p＜0.01）和合併急性腦病（p=0.047）。研究發現 16 天是預測急性高鉀血症≥6.5mmol/l 發生的臨界值，16 天內注射琥珀膽鹼發生率爲 1%（95%的可信區間:0%-4%）而 16 天后的發生率爲 37%（95%的可信區間：19%-58%）。
結論：此研究揭示了注射琥珀膽鹼後動脈血鉀增高風險與 ICU 停留時間有密切關係。在 ICU 中停留超過 16 天，急性高鉀血症≥6.5mmol/l 發生的風險顯著增加。
（鄭華容　譯　陳傑　校）

BACKGROUND: Urgent tracheal intubations are common in intensive care units (ICU), and succinylcholine is one of the first-line neuromuscular blocking drugs used in these situations. Critically ill patients could be at high risk of hyperkalemia after receiving succinylcholine because one or more etiologic factors of nicotinic receptor upregulation can be present, but there

are few data on its real risk. Our objectives in this study were to determine the factors associated with arterial potassium increase (ΔK) and to assess the occurrence of acute hyperkalemia ≥6.5 mmol/L after succinylcholine injection for intubation in the ICU.
METHODS: In a prospective, observational study, all critically ill patients intubated with succinylcholine in an ICU were screened. Only intubations with arterial blood gases and potassium measurements before and after (K_{after}) a succinylcholine injection were studied.
RESULTS: During 18 months, 131 critically ill patients were intubated after receiving succinylcholine with arterial potassium before and after intubation (K_{after}) for a total of 153 intubations. After multivariate analysis, the only factor associated with ΔK was the length of ICU stay before intubation ($\rho = 0.561$, $P < 0.001$). The factors associated with K_{after} ≥6.5 mmol/L ($n = 11$) were the length of ICU stay ($P < 0.001$) and the presence of acute cerebral pathology ($P = 0.047$). The threshold of 16 days was found highly predictive of acute hyperkalemia ≥6.5 with 37% (95% confidence interval: 19%–58%) of K_{after} ≥6.5 after the 16th day compared with only 1% (95% confidence interval: 0%–4%) of K_{after} ≥6.5 when succinylcholine was injected during the first 16 days.
CONCLUSIONS: This study shows that the risk of ΔK after succinylcholine injection is strongly associated with the length of ICU stay. The risk of acute hyperkalemia ≥6.5 mmol/L is highly significant after 16 days.

綜述：肥胖產婦的分娩鎮痛

Focused Review: Labor Analgesia for the Obese Parturient

Elizabeth H. Ellinas, MD
From the Department of Anesthesiology, Medical College of Wisconsin, Milwaukee, WI.
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肥胖產婦的產科麻醉面臨多重挑戰，包括妊娠期合併症、分娩期併發症發生率的增加及椎管內分娩鎮痛的潛在困難和失敗。此綜述討論這些挑戰並提出在這些人群中，增加分娩期鎮痛成功率的可能方法。
（孫曉瓊　譯　陳傑　校）
Obese parturients present obstetric anesthesia providers with multiple challenges, including increased incidence of maternal coexisting disease, labor complications, and potential for difficult initiation and failure of neuraxial labor analgesia. This focused review discusses these challenges, and suggests potential methods to increase labor analgesia success in this population.

地塞米松與甲強龍對預防住院患兒扁桃體切除術後預防嘔吐療效的比較：一項隨機試驗

A Comparison Between Dexamethasone and Methylprednisolone for Vomiting Prophylaxis After Tonsillectomy in Inpatient Children: A Randomized Trial

Marie T. Aouad, MD*, Viviane G. Nasr, MD*, Vanda G. Yazbeck-Karam, MD*, Mohammad A. Bitar, MD*, Micheline Bou Khalil, MD†, Ornella Beyrouthy, MD*, Diala Harfouche, MD*, Norma Terrin, PhD‡ and Sahar Siddik-Sayyid, MD*
From the *Department of Anesthesiology, American University of Beirut Medical Center, Beirut, Lebanon; †Department of Anesthesiology, Rafic Hariri University Hospital, Beirut, Lebanon; ‡Institute for Clinical Research and Health Policy Studies, Tufts Medical Center, Boston, MA.
Viviane G. Nasr, MD, is currently affiliated with the Department of Anesthesiology, Tufts Medical Center, Boston, MA. Vanda G. Yazbeck-Karam, MD, is currently affiliated with the Department of Anesthesiology, Lebanese American University, Beirut, Lebanon.

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背景：患兒行扁桃體切除術後嘔吐發生率很高，且伴有嚴重疼痛的發生，可延緩術後經口攝食並導致脫水風險增加。因此，需對此類高危患者行預防性治療。糖皮質激素，如地塞米松和甲強龍，具有抗炎和止吐的特點，而地塞米松被使用得更多。本研究假設甲強龍對預防患兒扁桃體切除術後嘔吐的療效並不劣于地塞米松。
方法：設計一項隨機雙盲實驗來比較 0.5 mg/kg 地塞米松和 2.5 mg/kg 甲強龍的單次劑量對於預防行全麻下扁桃體全切或部分切除的患兒術後 24 小時內嘔吐發生的療效（主要結果），將最低範圍設爲 9%。160 名在全麻下行扁桃體全切或部分切的患兒在誘導後被隨機分爲接受 0.5 mg/kg 地塞米松靜脈注射(n = 79)或 2.5 mg/kg 甲強龍靜脈注射 (n = 81)。根據手術類型，又對所有的研究結果進行深入分析。
結果：一項意向性治療分析顯示，總的嘔吐發生率在地塞米松組爲 30%，在甲強龍組爲 22%（差異：8%，95%可信區間[CI]：−5% to 21%）。一項流程分析顯示嘔吐發生率分別爲 32%和 23%，（差異：9%，95%可信區間[CI]：−5% to 23%，P_{sup} = 0.28）。經口攝食時間和品質以及靜脈補液時間，疼痛、滿意度評分及鎮痛藥需要量在兩組間相似。嘔吐發生率在扁桃體全切與部分切的患兒間也相似；然而相對扁桃體全切患者，部分切除患者的首次經口攝食時間、靜脈補液時間以及鎮痛藥需要更少，滿意度更高。
結論：根據意向性治療分析和流程分析，甲強龍在最差情況下比地塞米松的藥效差 5%。因此，甲強龍對於預防患兒扁桃體切除術後嘔吐非劣于地塞米松。
（瞿亦楓　譯　陳傑　校）
BACKGROUND: The frequent incidence of postoperative vomiting in children undergoing tonsillectomy, in addition to the occurrence of severe pain, may delay postoperative oral intake and lead to increased risk of dehydration. Thus, prophylactic therapy is indicated in this high-risk group. Glucocorticoids, such as dexamethasone and methylprednisolone, have anti-inflammatory and antiemetic properties with dexamethasone being frequently used. We hypothesized that methylprednisolone should be noninferior to dexamethasone for the prevention of vomiting in children after tonsillectomy.
METHODS: We designed a randomized double-blind trial to compare the efficacy of a single prophylactic dose of 0.5 mg/kg dexamethasone with a dose of 2.5 mg/kg methylprednisolone on the incidence of postoperative vomiting during the first 24 hours (primary outcome) in children undergoing total or partial tonsillectomy with a noninferiority margin set at 9%. One hundred sixty children undergoing total or partial tonsillectomy under general anesthesia were randomly assigned to receive either IV dexamethasone 0.5 mg/kg (n = 79) or methylprednisolone 2.5 mg/kg (n = 81) after induction of anesthesia. Secondary analysis of all studied outcomes was also performed according to the type of surgery.
RESULTS: An intention-to-treat analysis showed an overall incidence of vomiting of 30% in the dexamethasone group and of 22% in the methylprednisolone group (difference: 8%, 95% confidence interval [CI]: −5% to 21%). A per protocol analysis showed an incidence of vomiting of 32% and 23%, respectively (difference: 9%, and 95% CI of the difference: −5 to 23%, P_{sup} = 0.28). The time and quality of oral intake and the duration of IV hydration, as well as pain and satisfaction scores and the need for analgesics, were similar between the 2 groups. The incidence of vomiting was also similar in patients who had total versus partial tonsillectomy; however, time to first oral intake, duration of IV hydration, and the need for analgesics were less with better satisfaction scores in partial versus total tonsillectomy patients.

CONCLUSION: Methylprednisolone is at worst 5% less effective than dexamethasone by the intention-to-treat analysis, and by the per protocol analysis. Thus, it is noninferior to dexamethasone in preventing vomiting after tonsillectomy in children.

昂丹司瓊誘導惡性高熱易感個體的肌肉收縮

Ondansetron-Induced Muscular Contractures in Malignant Hyperthermia-Susceptible Individuals

Stephan Johannsen, MD, Norbert Roewer, MD and Frank Schuster, MD
From Department of Anaesthesia and Critical Care, University of Wuerzburg, Wuerzburg, Germany.
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背景：5-HT_3 受體拮抗劑昂丹司瓊，通常用於治療噁心嘔吐。但當一名 5 歲男童接受昂丹司瓊治療劑量死亡後，昂丹司瓊被疑可能誘發惡性高熱（MH）。爲了評估昂丹司瓊觸發 MH 的可能影響，對 MH 易感個體（MHS）和非 MH 易感個體（MHN）進行了肌肉標本的體外試驗。
方法：將 6 例 MHS 患者和 10 例 MHN 患者的肌束標本放置于不斷增加昂丹司瓊濃度（從 0.1 遞增至 300ug/mL)的培養皿進行培養。同時連續監測肌束靜息張力和顫搐高度。資料以中位數和四分位間距表示；組間差異進行 Mann–Whitney *U* 檢驗($P < 0.05$)。
結果：肌束標本的重量，長度，初始靜息張力和顫搐高度組間差異無統計學意義。在應用昂丹司瓊後，兩組均出現顫搐高度增加。然而，昂丹司瓊濃度達到 50ug/mL（MHS 2.5 [2.1 to 4.0] vs. MHN 0 [0 to 0] mN）和 100ug/mL 時 (18.0 [11.8 to 22.8] vs 0 [0 to 0] mN)，肌肉收縮只出現于 MHS 患者標本。達到 300ug/mL 時，肌束反應在 MHN 患者標本中同樣可以觀察到(23.3 [20.1 to 40.1] vs 1.8 [0.3 to 4.9] mN)。
結論：體外實驗中昂丹司瓊可引起骨骼肌肌束收縮，對 MHS 患者影響顯著高於 MHN 患者。由於引發肌肉收縮的昂丹司瓊必需濃度超過最低治療血漿濃度 500 倍，在體內引起肌束收縮的可能性很小。
（黃萍　譯　陳傑　校）

BACKGROUND: The 5-HT_3-receptor antagonist ondansetron, commonly used to treat nausea and vomiting, was suspected of triggering malignant hyperthermia (MH) when a 5-year-old boy died after receiving a therapeutic dose of ondansetron. To evaluate a possible influence of ondansetron on the onset of MH, we investigated its effect on muscle specimens of MH-susceptible (MHS) and MH-nonsusceptible (MHN) individuals in vitro.
METHODS: Muscle bundles of 6 MHS and 10 MHN patients were incubated in a tissue bath with ondansetron at increasing concentrations (0.1 to 300 μg/mL). Changes in resting tension and twitch height were monitored continuously. Data are reported as median and interquartile range; Mann–Whitney *U* test for differences between the groups ($P < 0.05$).
RESULTS: Weight, length, initial resting tension, and twitch height of the muscle bundles did not significantly differ between the investigated groups. An increasing twitch amplitude after ondansetron application was observed in both groups. However, contractures developed only in MHS but not in MHN muscle at ondansetron concentrations of 50 μg/mL (MHS 2.5 [2.1 to 4.0] vs. MHN 0 [0 to 0] mN) and 100 μg/mL (18.0 [11.8 to 22.8] vs 0 [0 to 0] mN). At 300 μg/mL ondansetron, a muscular response was also observed in MHN (23.3 [20.1 to 40.1] vs 1.8 [0.3 to 4.9] mN).

CONCLUSIONS: Ondansetron induced contractures in skeletal muscle bundles in vitro. The effect was significantly higher in MHS than in MHN muscle. Because the necessary concentration of ondansetron exceeded the therapeutic plasma levels by a minimum of 500 times, a trigger potency in vivo seems unlikely.

右美托咪定混合羅呱卡因可延長脛後神經感覺阻滯時間

Posterior Tibial Nerve Sensory Blockade Duration Prolonged by Adding Dexmedetomidine to Ropivacaine

Marie-Pier Malenfant Rancourt, MD*, Natalie T. Albert, MD, FRCPC*, Maxime Côté, MD, FRCPC*, Dany-R Létourneau, MD, FRCPC* and Paul-Marie Bernard, MSc†
From the Departments of *Anesthesiology and †Social and Preventive Medicine, Centre Hospitalier de l'Université Laval (CHUQ), Québec, Qc, Canada.
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背景：右美托咪定，一種 α_2 受體激動劑，用於椎管內和靜脈麻醉可延長鎮痛時間。本研究評估右美托咪定加入羅呱卡因行脛神經阻滯時對感覺阻滯時間的影響。
方法：在這項前瞻性、隨機、雙盲、交叉對照研究中，14 名健康志願者分爲 2 組。所有志願者接受超聲引導下離內踝近端 4-5cm 處的脛神經阻滯。在 R 組中，注射 0.5%羅呱卡因 10ml 用於阻滯，RD 組中，給予 0.5%羅呱卡因 10ml 和右美托咪定 1ug/kg 的混合溶液。注射後，監測生命體征，評估感覺阻滯起效與消失，以及鎮靜水準（警覺/鎮靜評分）。三周後，重複相同的過程，但是研究的物件交換入組。主要終點是感覺阻滯的持續時間。同時評估時間和滯後效應。次要終點是起效時間和副作用發生如低血壓，心動過緩，缺氧和鎮靜。
結果：神經阻滯持續時間 RD 組比 R 組更長（21.5h vs 16.2h；平均成對差異 5.3 小時，【95%可信區間爲 3.9-6.7 小時】；P<0,0001）。兩組作用起效時間相似。在整個研究期間，R 組中的平均收縮壓和舒張壓水準始終穩定。RD 組中，觀察到用藥後 60-480min 之間收縮壓和舒張壓有顯著下降（P<0.05）；RD 組中兩名志願者的收縮壓較基準值下降 30%，而 R 組則沒有發生。組間除了在 60min 時間點心率有差異（P<0.01）外，兩組中心率相似。
結論：右美托咪定加入羅呱卡因用於脛神經阻滯，在起效時間不變的情況下，可延長感覺阻滯時間。然而，應當對患者進行監測以避免潛在的不良事件如低血壓，心動過緩和鎮靜。
（詹凱誕　譯　陳傑　校）

BACKGROUND: Dexmedetomidine, an α_2-receptor agonist, prolongs analgesia when used in neuraxial and IV blocks. We evaluated the effect of dexmedetomidine added to ropivacaine for tibial nerve block on the duration of the sensory blockade.
METHODS: For this prospective, randomized, controlled, double-blind, crossover trial, 14 healthy volunteers were allocated to 2 groups. All volunteers received an ultrasound-guided tibial nerve block 4 to 5 cm proximally to the medial malleolus. In group R, 10 mL of 0.5% ropivacaine was injected for the block; in group RD, 10 mL of a solution containing 0.5% ropivacaine with 1 μg/kg of dexmedetomidine was administered. After the injection, monitoring of vital signs, evaluation of onset and resolution of sensory block, and level of sedation (Observer's Assessment of Alertness/Sedation scale) were performed. Three weeks later, the same procedure was repeated, but the study subjects were allocated to the other group in a

crossover fashion. The primary end point was the duration of sensory blockade. The time and carryover effects were also evaluated. Secondary outcomes were the onset time and the presence of adverse effects such as hypotension, bradycardia, hypoxia, and sedation.
RESULTS: Sensory blocks lasted longer in group RD than in group R (21.5 vs 16.2 hours; mean pairwise difference 5.3 hours [95% confidence interval: 3.9–6.7 hours]; $P < 0.0001$). Onset times were similar between groups. The mean systolic and diastolic blood pressure levels were stable throughout the study period in group R. In group RD, a noticeable decrease in systolic and diastolic blood pressure was observed between 60 and 480 minutes ($P < 0.05$); 2 volunteers experienced a 30% decrease in systolic blood pressure when compared with the baseline value as compared with none in group R. Heart rate was similar between groups except at 60 minutes ($P < 0.01$).
CONCLUSION: Dexmedetomidine added to ropivacaine for tibial nerve block prolongs the duration of sensory blockade with similar onset time. However, patients should be monitored for potential adverse effects such as hypotension, bradycardia, and sedation.

簡報：患者接受 Whitacre 型穿刺針側向注射局麻藥時維持長時間側臥位可產生對稱的感覺阻滯

Brief Report: Lateral Injection Using a Whitacre Needle with Patients in the Lateral Decubitus Position Maintained for a Prolonged Time Period Produces Symmetric Sensory Block

Yulong Cui, MD*†, Junmei Xu, MD*†, Xinghua Jiang, MD*†, Ruping Dai, MD*†, Jiabi Qin, PhD‡, Yanqin Wu§, Xinyi Wen, MS§ and He Li, MS§
*From the Department of Anesthesiology, The Second Xiangya Hospital, Central South University, Changsha, Hunan, China; †Anesthesiology Research Institute, Central South University, Changsha, Hunan, China; ‡Department of Epidemiology and Health Statistics, School of Public Health, Central South University, Changsha, Hunan, China; and §Department of Anesthesiology, Wenzhou Third People's Hospital, Wenzhou, Zhejiang, China.
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背景：通過 Whitacre 型穿刺針的針尖方向定向注射藥物可以調整感覺阻滯平面。假設使用 Whitacre 型穿刺針注射高比重局麻藥，針尖斜面朝向側面可以產生更爲對稱的感覺阻滯。
方法：擇期行腰麻下下肢手術病人，側臥位下隨機接受 1 種或 2 種不同針尖方向（Whitacre 型穿刺針，朝頭側或者側面）0.5%重比重布比卡因 10mg 的穿刺麻醉。注射藥物後維持側臥位元 15min，再記錄感覺阻滯情況。主要結果爲在手術側以及對側感覺平面比較。採用 Wilcoxon-Mann-Whitney，U 檢驗非配對非參數資料。配對資料採用 Hodges-Lehman 估計組間阻滯節段的中位數差異以及 95%可信區間（CI）
結果：側向注射組的手術區和對側區的阻滯平面無顯著性差異。Hodges-Lehmann 點估計量爲 0.5%，95%可信區間爲 0-2.5，意味著在足夠長的側臥時間下患者感覺阻滯平面可更對稱。頭向注射組中，對側的平面顯著低於手術側。Hodges-Lehmann 點估計量爲 2.5 個節段，95%可信區間爲 0.5-5.
結論：Whitacre 型穿刺針針尖側向注射 0.5%重比重布比卡因 10mg 可使手術側和對側產生的感覺阻滯平面更對稱。
（陸秉瑋　譯　陳傑　校）

BACKGROUND: The directional flow of injection through a Whitacre needle can be used to modify the level of sensory blockade. We hypothesized that injection of hyperbaric local anesthetic through a Whitacre needle with the bevel oriented laterally can produce a more symmetric sensory block.
METHODS: Patients scheduled for lower limb surgery under spinal anesthesia with the patient in lateral decubitus position were randomized to receive 10 mg, 0.5% hyperbaric bupivacaine with the Whitacre needle orifice in 1 of 2 orientations, cephalad and lateral. The patient's position was maintained for 15 min after the injection, and sensory blocks were recorded. The primary outcome was the sensory levels between the dependent and nondependent side. The Wilcoxon-Mann-Whitney *U*-test odds was used to compare unpaired nonparametric data. For the paired samples, 95% confidence intervals (CI) of differences between group medians were calculated using the Hodges-Lehman estimator for the median difference in number of blocked segments.
RESULTS: There was no significant difference in block level between dependent and nondependent sides in the lateral group. The Hodges-Lehmann point estimator was 0.5% and 95% CI was 0–2.5, suggesting a more symmetric sensory block in patients in the lateral decubitus position maintained for a sufficient period of time. A significantly lower level of blockade was noticed on the nondependent side compared to the dependent side in the cephalad group. The Hodges-Lehmann point estimator was 2.5 segments and 95% CI was 0.5–5.
CONCLUSIONS: Injection of 10 mg of 0.5% hyperbaric bupivacaine with the bevel of the Whitacre needle oriented laterally produces more symmetric sensory levels of blockade between the dependent and nondependent sides.

新鮮全血用於治療失血性休克： 避免出現併發症的同時認識其效益

Fresh Whole Blood Use for Hemorrhagic Shock: Preserving Benefit While Avoiding Complications

Philip C. Spinella, MD*，Heather L. Reddy, PhD†,Jennifer S. Jaffe, MPH*,Andrew P. Cap, MD, PhD, FACP‡and Raymond P. Goodrich, PhD†
From the *Department of Pediatrics, Washington University in St. Louis, St. Louis, Missouri; †Terumo BCT Biotechnologies, LLC, formerly known as Caridian BCT Biotechnologies, LLC, Lakewood, Colorado; and ‡U. S. Army Institute of Surgical Research, Fort Sam Houston, Texas.
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隨著血液儲存及加工技術的發展，過去一段時間內對失血性休克病人輸血支援的認識有了變化。輸血技術隨著第一次世界大戰中對全血的應用而發展，而現在，在發達國家，多以成分輸血治療爲主。與此相反，在一些發展中國家的部分兒童醫院及條件簡陋的醫院，臨床上仍然使用新鮮全血。在大出血的病人中，新鮮全血的應用相對成分輸血也有其依據，但相關的前瞻性隨機預期臨床研究卻很少。近期在成人創傷患者及複合嚴重休克和凝血障礙的重症患者給予新鮮全血治療的的回顧性研究，也有這個爭論數十年的問題。隨著近期對輸注新鮮全血風險的認識，對血液相應加工及儲存方法的也得到了重視。重要的是要認識到，目前血液成分處理和存儲的方法還沒有得到充分的探討，以確定它們是否影響臨床結果。在此文中，我們需要衡量任何引起出血性休克病人使用新鮮全血的風險及利益，隨著現在及未來對血液處理及儲存方法的變化，臨床使用新鮮全血的效率及安全性也將受影

響。爲此我們提出假說及臨床調查，確定如何取得臨床上使用新鮮全血風險利益比值最大化。
（鄧利兵譯 薛張綱校）
Transfusion support of patients with hemorrhagic shock has changed over time with the development of storage and processing methods. Transfusion medicine developed during World War I with the use of whole blood, and now in the developed world, component therapy predominates. In contrast, there is still clinical use of fresh whole blood (FWB) in the developing world, in a minority of children's hospitals, and in combat settings. Although there is a rationale for the use of FWB in massively bleeding patients compared with the use of individual components, it has rarely been analyzed in prospective randomized clinical trials. Recent retrospective studies in adult trauma and mixed critically ill patients have revived this decades-old controversial question of the value of FWB for patients with severe shock and coagulopathy or those at risk. The risks of FWB use have also been highlighted recently, which has caused some to focus on reducing these risks with alternative processing and storage methods. It is important to recognize that current processing and storage methods for components have also not been adequately explored to determine whether they affect clinical outcomes. In this article, we review potential benefits and risks of FWB use for patients with hemorrhagic shock from any cause, and how current and future processing and storage methods may affect efficacy and safety of FWB in this population. We intend this review to stimulate hypothesis generation and clinical investigation in determining when FWB may be indicated and how to optimally process and store FWB to maximize its risk-benefit ratio

食欲素——對於鼠的異丙酚麻醉的促醒因數

Orexin-a facilitates emergence from propofol anesthesia in the rat

Li-Na Zhang, MM, Zhao-Ju Li, MM, Li Tong, MM, Chao Guo, MM, Ji-Yuan Niu, MD, Wu-Gang Hou, MD and Hai-Long Dong, MD, PhD
From the Department of Anesthesiology, Xijing Hospital, Fourth Military Medical University, Xian, China.
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背景：下丘腦的食欲素神經元在促進和維持哺乳動物的覺醒狀態中發揮重要作用。先前的研究已經表明，食欲素神經元被異氟烷和七氟烷所抑制，而微注射食欲素則會促使其脫離揮發性麻醉劑的作用。在此項研究中，我們首先驗證我們的假定：食欲素神經元的活性被異丙酚所抑制。在此之外，我們也將闡明：位於基底前腦的食欲素的作用——調節異丙酚麻醉的麻醉-蘇醒週期
方法：老鼠分別在在靜脈注射異丙酚0分鐘、30分鐘、60分鐘和120分鐘麻醉完成後反射恢復時處死。我們用 c-Fos 的表達監測食欲素神經元的活性。通過放射免疫法測定血漿中的食欲素-A 的濃度。在異丙酚靜脈注射前15分鐘或是異丙酚注射完15分鐘前我們將食欲素 A(30或100pmol)或食欲素-1受體拮抗劑——SB-334867A(5或20μg）微注射入鼠的基底前腦。記錄失去反射和反射恢復的時間爲誘導和蘇醒的時間。
結果：C-Fos 免疫反應性食欲素神經元的減少表示異丙酚麻醉抑制了食欲素神經元活性。當老鼠從麻醉中蘇醒時食欲素神經元的活性恢復。異丙酚麻醉減少了血漿中食欲素-A 的

濃度。基底部微注射食欲素-A 對於誘導時間沒有影響但加快了蘇醒時間。相反，微注射食欲素-1受體拮抗劑 SB-334867A 延緩了蘇醒時間。
結論：我們的研究表明：異丙酚麻醉抑制了食欲素神經元的活性，位於基底前腦的食欲素參與了異丙酚麻醉的麻醉-蘇醒週期。
（郭晨躍譯 薛張綱校）
BACKGROUND:Hypothalamic orexinergic neurons play a critical role in the promotion and maintenance of wakefulness in mammals. Previous studies have demonstrated that activities of orexinergic neurons were inhibited by isoflurane and sevoflurane, and microinjection of orexin facilitated the emergence from volatile anesthesia. In this study we first examined the hypothesis that the activity of orexin neurons is inhibited by propofol anesthesia. Moreover, the role of the orexinergic signals in basal forebrain in regulating the anesthesia-arousal cycle of propofol anesthesia is also elucidated.
METHODS:Rats were killed at 0, 30, 60, and 120 minutes of propofol infusion as well as at the time the righting reflex returned after the termination of anesthesia. Activated orexinergic neurons were detected by c-Fos expression. The plasma concentrations of orexin-A were measured by radioimmunoassay. Orexin-A (30 or 100 pmol) or the orexin-1 receptor antagonist, SB-334867A (5 or 20 μg), was microinjected into the basal forebrain 15 minutes before propofol infusion, or 15 minutes before the termination of propofol infusion. The loss and the return of the righting reflex time were recorded as the induction and the emergence time.
RESULTS:Propofol anesthesia resulted in an inhibition of orexinergic neuron activity as demonstrated by the reduced numbers of c-Fos-immunoreactive orexinergic neurons. The activities of orexinergic neurons were restored when rats emerged from anesthesia. Propofol anesthesia decreased plasma orexin-A concentrations. Intrabasalis microinjection of orexin-A had no effect on the induction time but facilitated the emergence from propofol anesthesia. Inversely, intrabasalis microinjection of the orexin-1 receptor antagonist SB-334867A delayed the emergence from propofol anesthesia.
CONCLUSIONS:Our findings indicate that activity of orexinergic neurons is inhibited by propofol anesthesia, and the orexin signals in basal forebrain are involved in anesthesia-arousal regulation from propofol anesthesia.

通過容量動力學監測脫水

Detection of dehydration by using volume kinetics

Joachim Zdolsek, MD, PhD, Yuhong Li, MD, PhD and Robert G. Hahn, MD, PhD
From the Department of Anesthesia, Faculty of Health Sciences, Linköping University, Linköping, Sweden.
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背景：手術患者多數存在脫水情況，除了超過體重 5%的嚴重脫水，一般的情況難以診斷，假設注射一定劑量的晶體液後，可以通過流體動力分析血紅蛋白濃度監測脫水的程度。
方法：將 10 名健康志願男性分爲 4 組，互相隔離至少 2 天，每人給予醋酸鈉林格氏液 5-10ml/kg 至少 15 分鐘，開始靜注前，給予速尿致容量損耗達 1.5-2L（相當於體重的

2%），120 分鐘後根據血紅蛋白濃度計算注射液體的清除率和半衰期，改變體位後通過脈氧飽和度監測灌注指數和脈氧可變指數。
結果：脫水後，林格氏液清除率從 1.84 下降至 0.53mL/kg/min，半衰期從 23 延長至 76 分鐘，注射量越小，脫水狀態和非脫水狀態下前兩者的差異越明顯，此時，尿排泄量不可靠，脫水降低灌注指數，但對脈氧飽和指數無影響。
結論：脫水達體重 2%時可通過注射 5ml/kg 醋酸林格氏液後監測液體清除率和及半衰期。（韓敘譯 薛張綱校）
BACKGROUND: Patients admitted to surgery may be dehydrated, which is difficult to diagnose except when it is severe (>5% Gl116 of the body weight). We hypothesized that modest dehydration can be detected by kinetic analysis of the blood hemoglobin concentration after a bolus infusion of crystalloid fluid.
METHODS: Four series of experiments were performed on 10 conscious, healthy male volunteers. Separated by at least 2 days, they received 5 or 10 mL/kg acetated Ringer's solution over 15 minutes. Before starting half of the IV infusions, volume depletion amounting to 1.5 to 2.0 L (approximately 2% of body weight) was induced with furosemide. The elimination clearance and the half-life of the infused fluid were calculated based on blood hemoglobin over 120 minutes. The perfusion index and the pleth variability index were monitored by pulse oximetry after a change of body position.
RESULTS: Dehydration decreased the elimination clearance of acetated Ringer's solution [median (25th-75th percentile)] from 1.84 (1.23-2.57) to 0.53 (0.41-0.79) mL/kg/min (Wilcoxon matched-pair test $P < 0.001$) and increased the half-life from 23 (12-37) to 76 (57-101) minutes ($P < 0.001$). The smaller infusion, 5 mL/kg, fully discriminated between experiments performed in the euhydrated and dehydrated states, whereas the urinary excretion provided a less-reliable indication of hydration status. Dehydration decreased the perfusion index but did not affect the pleth variability index.
CONCLUSION: Dehydration amounting to 2% of the body weight could be detected from the elimination clearance and the half-life of an infusion of 5 mL/kg Ringer's solution.

簡要報告：受體特異性決定丙泊酚和磷丙泊酚致痛屬性。

Brief report: receptor specificity defines algogenic properties of propofol and fospropofol.
Amol Patwardhan, MD, PhD*‡, Rebecca Edelmayer, PhD†‡, Emil Annabi, MD*, Theodore Price, PhD†, Phil Malan, MD, PhD*† and Gregory Dussor, PhD†
From the *Department of Anesthesiology and †Department of Pharmacology, University of Arizona Health Sciences Center, Tucson, Arizona.
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背景：丙泊酚引起注射部位疼痛，而磷丙泊酚 不引起。 我們猜測，不像丙泊酚，磷丙泊酚啓動刺激性受體（TRPA1 受體）。
方法：我們利用電生理和行爲學來檢測前面的假設。
結果：我們的資料表明，異丙酚（100μM）只在表達 TRPA1 受體的神經元上引起內向電流。 然而，磷丙泊酚（100μM 和 1mM）不能引起無論 TRPA1 受體陽性或 TRPA1 受體陰性的神經元的去極化電流。 丙泊酚和磷丙泊酚都能產生的全身麻醉。
結論：磷丙泊酚不能產生致痛性最可能是無法啓動傷害性感受器 TRPA1。

（賀盼譯 薛張綱校）

BACKGROUND:Propofol-evoked injection site pain is not observed with fospropofol. We hypothesized that unlike propofol, fospropofol does not activate the irritant receptor, transient receptor potential 1 (TRPA1).
METHODS:We tested the hypothesis using electrophysiology and behavioral studies.
RESULTS:Our data demonstrate that propofol (100 μM) evokes an inward current only in TRPA1-expressing neurons. However, fospropofol (100 μM and 1 mM) is unable to evoke depolarizing currents in either TRPA1-positive or TRPA1-negative neurons. Both propofol and fospropofol produced general anesthesia.
CONCLUSIONS:The lack of algogenic activity in fospropofol is most likely the result of its inability to activate TRPA1 on nociceptors.

Bonfils 纖維喉鏡磨牙後入路臨床應用的回顧

Clinical Uses of the Bonfils Retromolar Intubation Fiberscope: A Review

.Sze-Ying Thong, MBBS, MMed (Anaes) and Theodore Gar-Ling Wong, MD, FRCPC
From the Department of Anaesthesia, Singapore General Hospital, Singapore.
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Bonfils 纖維喉鏡是一種帶有 40 度彎頭的硬性直光學纖維鏡，這有利於有針對性的插管。在 1983 年第一次記載 Bonfils 纖維喉鏡採用磨牙後入路對小頜畸形綜合征兒童進行氣管插管。在經過最初一段嚴峻的學習經歷後，Bonfils 纖維喉鏡已成爲管理正常和困難氣道的有力工具。它的優點在於它可當做一個光纖插管探頭，使插管過程中氣管導管頭端視覺化。纖細的外形使它可在張口受限及頸椎活動受限的病人中使用。不像可屈光纖鏡，它的硬性結構提高了其操作性並使其可插過軟組織障礙物。內窺鏡方向的應用 Bonfils 光纖鏡比可屈光纖鏡更優，並且它同樣輕便、耐用、設置簡便。Bonfils 光纖鏡使用者感覺到其使用過程中最主要的困難和所有光纖鏡一樣，血液、分泌物、霧氣和接觸組織會限制視野。此外，使用 Bonfils 光纖鏡不能採用鼻插管，可能直接導致組織傷和氣壓傷。雖然插管成功率非常高，但它仍然十分依賴于操作人員。其插管時間不如傳統喉鏡，費時多在某些方面可能是一個問題。總之，經過初期訓練後，Bonfils 光纖鏡是管理困難氣道的有效工具。

（方昕譯 薛張綱校）

The Bonfils Retromolar Intubation Fiberscope is a rigid, straight fiberoptic device with a 40-degree curved tip, which facilitates targeted intubation. Bonfils, using a retromolar approach to intubate tracheas of children with Pierre Robin syndrome, was first described in 1983. After an initial steep learning curve, the Bonfils becomes a useful device in the management of normal and difficult airways. The advantages lie in its performance as an optical intubating stylet, which allows visualization from the tip of the endotracheal tube during intubation. The slim profile makes it useful in patients with limited mouth opening and cervical spine movement. Unlike the flexible fiberoptic bronchoscope, its rigid structure improves maneuverability and allows insertion past soft tissue obstructions. Endoscopic orientation of the Bonfils is better than the flexible fiberoptic bronchoscope, and it is also portable, durable, and simple to set up. The main difficulty experienced by Bonfils users is common to all fiberoptic scopes, limited view due to blood, secretions, fogging, and tissue contact. Additionally, nasal intubation is not possible with the Bonfils, and direct trauma and barotrauma are possible. Although the intubation success rate

is high, it is still very much operator dependent. Time to intubation is inferior to conventional laryngoscopy, and its expense may be an issue in some centers. In conclusion, the Bonfils is an effective tool for management of the difficult airway after initial training.

在正常健康懷孕婦女血栓彈力圖和標準止血實驗室測試的前瞻性縱向研究

Prospective Longitudinal Study of Thromboelastography and Standard Hemostatic Laboratory Tests in Healthy Women During Normal Pregnancy

Ove Karlsson, MD*, Tommy Sporrong, MD, PhD†, Andreas Hillarp, PhD‡, Anders Jeppsson, MD, PhD ‖ ¶ and Margareta Hellgren, MD, PhD†#
From the *Department of Anesthesiology and †Department of Obstetrics, Sahlgrenska University Hospital, Gothenburg, Sweden; ‡University and Regional Laboratories Region Skåne, Clinical Chemistry, University Hospital, Malmö, Sweden; ‖ Department of Cardiovascular Surgery and Anesthesia, Sahlgrenska University Hospital, Gothenburg, Sweden; ¶Department of Molecular and Clinical Medicine, Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden; and #Department of Prenatal Care, Primary Care, South Bohuslän, Sweden.
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背景：止血障礙是常見的產科併發症。血栓彈力圖（TEG® ）用於同時測量 10 至 20 分鐘內凝血和纖溶作用。在這個前瞻性縱向研究中我們的首要目標是獲得在正常懷孕和 8 周產後的 TEG® 生理變數。第二個目的是比較產後 8 周及妊娠 10～15 周 TEG® 變數的變化並且將 TEG® 參數和標準實驗室分析關聯起來。
方法：收集了 45 位健康懷孕婦女從孕 10~15 周、20~22 周、28~30 周、38~40 周及產後 8 周的血液標本。 接下來 TEG 分析包括：凝血時間(TEG® -R)，20 毫米血凝塊形成的時間(TEG® -K)，凝血角度(TEG® -Angle)，最大振幅(TEG® -MA)，30 分鐘後溶解(TEG® -LY30)。並對活化部分凝血活酶時間，凝血酶原時間，可溶性纖維蛋白，抗凝血酶，D-二聚體，和血小板計數進行了分析。
結果：與產後 8 周相比孕期 TEG® -R 至少縮短 0.9 分鐘一直到孕 28 到 30 周（上限 99%可信區間），平均減少在 23%-26%。 TEG® -K 在整個孕期至少縮短 0.1 分鐘，平均減少在 18%-35%之間。TEG® -Angle 在孕期至少增加 2.5 度，平均增加在 6%-8%。TEG® -LY30 在孕 28-30 周和孕 38-40 周至少降低 0.03%，平均減少幅度在 67%-73%。常規凝血功能實驗室檢查結果均在正常懷孕的界限範圍內。TEG® 和實驗室變數之間的不相關或弱相關。
結論：TEG® 反映出孕期凝血功能增加纖溶系統功能降低。止血啓動更快，血凝塊強度增加。在妊娠後期纖溶下降。孕期需要可供選擇的 TEG® 變數限值。孕期標準止血的實驗室測試與預期一致。確定粘彈性方法是否是在診斷產後出血凝血功能障礙的最好的標準止血實驗方法的研究還需進一步進行。
（李麗紅譯 薛張綱校）

BACKGROUND:Hemostatic disorders are common in obstetric complications. Thromboelastography (TEG®) simultaneously measures coagulation and fibrinolysis within 10 to 20 minutes. Our primary aim in this prospective longitudinal study was to obtain knowledge about physiological changes in TEG® variables during normal pregnancy and 8 weeks postpartum. The secondary aims were to compare TEG® variables during pregnancy with TEG® variables 8 weeks postpartum and gestational weeks 10 to 15 and to correlate TEG® variables to standard laboratory analyses.

METHODS:Blood samples were collected from 45 healthy pregnant women at gestational weeks 10 to 15, 20 to 22, 28 to 30, and 38 to 40, and at 8 weeks postpartum. The following TEG® analyses were performed: time until start of clotting (TEG® -R), time until 20-mm clot firmness (TEG® -K), angle of clotting (TEG® -Angle), maximum amplitude (TEG® -MA), and lysis after 30 minutes (TEG® -LY30). Activated partial thromboplastin time, prothrombin time, soluble fibrin, antithrombin, D-dimer, and platelet count were analyzed.
RESULTS:Compared to 8 weeks postpartum TEG® -R was at least 0.9 minutes shorter (upper limit 99% confidence intervals) until gestational weeks 28 to 30 and the mean reduction varied between 23%-26%. TEG® -K was at least 0.1 minutes shorter throughout pregnancy and the mean reduction varied between 18%-35%. TEG® -Angle was at least 2.5 degrees greater duringpregnancy and the mean increase varied between 12%-20%. TEG® -MA was also at least 0.4 mm greater during pregnancyand the mean increase varied between 6%-8%. TEG® -LY30 was at least 0.03% lower during gestational weeks 28 to 30 and 38 to 40 and the mean reduction varied between 67%-73%. The routine coagulation laboratory values were within normalpregnant limits. There were no or weak correlations between TEG® and the laboratory variables.
CONCLUSIONS:TEG® demonstrates increased coagulability and decreased fibrinolysis during pregnancy. There was a faster initiation of hemostasis, with a minor increase in clot strength. Fibrinolysis decreased during late pregnancy. Alternative cutoff limits for TEG® variables may be required during pregnancy. Standard hemostatic laboratory tests were as expected duringpregnancy. Future studies are needed to ascertain whether viscoelastic methods are preferable to standard hemostatic testsfor the diagnosis of coagulopathy during obstetric hemorrhage.

靜脈注射碳酸氫鈉能夠證實行機械通氣兒童的靜脈導管位置

Intravenous sodium bicarbonate verifies intravenous position of catheters in ventilated children

Ilan Keidan, MD*†, Erez Ben-Menachem, MBCHB, FANZCA*, Sno Ellen White, MD† and Haim Berkenstadt, MD*
From the *Department of Anesthesia and Intensive Care, Sheba Medical Center, affiliated with the Sackler Faculty of Medicine, Tel Aviv University, Israel; †Department of Anesthesiology, University of Florida, Gainesville, Florida.
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背景：兒童的通路血管容易有意外的靜脈輸液外滲和藥物對組織的潛在損傷。在這個前瞻性的對照研究中我們對行機械通氣的兒童診斷實用程式使用靜脈稀釋碳酸氫鈉確認放置靜脈導管。稀釋的碳酸氫鈉是由 8.4%未被稀釋的碳酸氫鈉和無菌水按 1:3 和 1:5 的比例分別稀釋爲 2.1%和 1.05%的碳酸氫鈉。
方法：分析 18 例年級爲 1-8 歲，ASA 分級爲 I-II 級的行機械通氣的兒童中，以隨機的順序注射稀釋爲 2.1%、1.05%的碳酸氫鈉以 1ml/kg 和 0.9%的生理鹽水。所有的孩子都監測氧飽和度、動脈血壓、心電監護和呼氣末二氧化碳。另外，分析注射前的靜脈血樣本和最後注射 10 分鐘後的靜脈血樣本的 PH 值和電解質。
結果：孩子中，靜脈注射稀釋爲 2.1%的碳酸氫鈉會使呼氣末二氧化碳顯著增加（平均 32.8+/-3.4mmHg 至 39.0+/-3.5mmHg，P<0.001），意味著在做 3 次呼吸增加了 6.2mmHg

（95%的預測區間爲 4.3 至 8.1mmHg）。靜脈注射稀釋爲 1.05%的碳酸氫鈉更明顯，在呼氣末二氧化碳更明顯（33.4 ± 3.8 mm Hg to 36.3 ± 3.4 mm Hg, P < 0.001），意味著 3 次呼吸增加了 2.9mmHg（95%的預測區間爲 1.8 至 4.1mmHg）。生理鹽水沒有什麼明顯改變，平均增加了 0.06mmHg（95%預測區間爲-1.3 to 1.4 mm Hg）。在未知的麻醉後通過觀察呼氣末二氧化碳的變換可以輕易的很快的分辨出兩種稀釋濃度的碳酸氫鈉和生理鹽水。分析注射前和注射後的靜脈 PH 值，碳酸氫鹽和鈉離子濃度不能檢測到臨床上的顯著改變。在經脈中標記了一個小的且統計上顯著的增加。
結論：在 ASA 分級爲 I-II 級，行機械通氣的兒童中注射 2.1%的碳酸氫鈉通過呼氣末二氧化碳的增加能夠識別血管內靜脈導管的位置。這種注射在臨床上不會顯著影響血液 PH 值、碳酸氫鹽和鈉離子濃度。
（孫麗萍譯 薛張綱校）

BACKGROUND: Vascular access in children carries a significant risk of accidental extravasation of IV fluids and medications with the potential for tissue injury. In this prospective controlled study we assessed the diagnostic utility of using IV diluted sodium bicarbonate to confirm placement of IV catheters in ventilated children. Diluted sodium bicarbonate was created using undiluted standard 8.4% (1 mEq/mL) sodium bicarbonate mixed in a 1:3 and 1:5 ratio with sterile water to achieve a final diluted concentration of 2.1% (0. 25 mEq/mL) and 1.05% (0.125 mEq/mL) sodium bicarbonate, respectively.
METHODS: In 18 ASA I-II mechanically ventilated children ages 1 to 8 years, the effects of 1 mL/kg of dilute 2.1%, 1.05% sodium bicarbonate, or 0.9% normal saline, injected in a randomized order, were analyzed. All children had oxygen saturation, arterial blood pressure, electrocardiograph, and end-tidal carbon dioxide (ETCO(2)) monitoring. In addition, venous blood samples were taken before injection and 10 minutes after the final injection for analysis of venous blood pH and electrolytes.
RESULTS: In children, IV diluted 2.1% sodium bicarbonate resulted in significantly increased etco(2) (mean of 32.8 ± 3.4 mm Hg to 39.0 ± 3.5 mm Hg, P < 0.001), a mean increase of 6.2 mm Hg (95% prediction interval: 4.3 to 8.1 mm Hg) within 3 breaths. Intravenous diluted 1.05% sodium bicarbonate caused a less pronounced but still significant increase in etco(2) (33.4 ± 3.8 mm Hg to 36.3 ± 3.4 mm Hg, P < 0.001), a mean increase of 2.9 mm Hg (95% prediction interval: 1.8 to 4.1 mm Hg) within 3 breaths. Normal saline did not result in any significant changes, with a mean increase of 0.06 mm Hg (95% prediction interval: -1.3 to 1.4 mm Hg). Both concentrations of sodium bicarbonate were easily differentiated from normal saline injection by blinded anesthesiologists observing the change in etco(2) values immediately after injection. Analysis of pre- and postinjection venous pH, bicarbonate, and sodium levels could not detect clinically significant changes. A small but statistically significant increase in venous bicarbonate was noted.
CONCLUSION: The injection of 2.1% sodium bicarbonate in mechanically ventilated ASA I-II children identified intravascular placement and patency of an IV catheter by an increase in the exhaled CO(2) concentration. The injections did not have any clinically significant effects on blood pH, bicarbonate, or sodium concentration.

體外迴圈患兒改變肝素效能觀察對活化凝血時間的影響

Change in heparin potency and effects on the activated clotting time in children undergoing cardiopulmonary bypass.

Nina A. Guzzetta, MD, FAAP, Sapan J. Amin, MD, Alexandra K. Tosone and Bruce E. Miller, MD
From the Department of Anesthesiology, Emory University School of Medicine, Children's Healthcare of Atlanta, Atlanta, GA.
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背景：肝素是體外迴圈中最常用的抗凝藥，其主要檢測項目爲活化凝血時間。2009 年十月，美國食品藥品管理局修改了美國藥典的專著普通肝素採用新的品質測試和新的效能試驗和參考標準，後者在體外試驗中降低了 10%單位的肝素效能。在整合“新”肝素入試驗後，我們主觀上認定在體外迴圈開始前使用，其相對常規肝素負荷量縮短了活化凝血時間。爲提供客觀證據以驗證這一假設，我們以活化凝血時間爲標準，評價新肝素的抗凝恢復並記錄行體外迴圈前低於我們最初的閾值的活化凝血時間。
方法：病例回顧分析分析了在亞特蘭大兒童保健院所有行體外迴圈的兒童，分“舊肝素”組（2008 年 7 月 1 日至 2009 年 6 月 30 日）和“新肝素”組（2010 年 6 月 1 日至 2011 年 5 月 31 日）。分別記錄基礎活化凝血時間和給予 400 U/kg 肝素後的活化凝血時間我們決定各組活化凝血時間在給予肝素後至開始體外迴圈前小於 480 秒的患者人數。另外，根據年齡將患兒分成 3 組（<1 月，1 至 12 月，大於 12 月）以便分析相似的活化凝血時間的改變。
結果：新肝素組肝素後活化凝血時間明顯短於舊肝素組，且在給予最初肝素負荷量後有更多的患兒活化凝血時間<480 秒（舊肝素組：68/557[12.2%]；新肝素組: 140/491 [28.5%]; P < 0.0001).）。對年齡分組分析後各組的差異顯著。
結論:我們針對以下假設提供客觀證據：在開始體外前給予不同效能的肝素，以活化凝血時間爲評價標準，使用新肝素明顯降低了活化凝血時間。這一結果在不同年齡組都得到了體現，且新肝素更易於低於體外迴圈的閾值。應考慮在體外迴圈前根據體重給予肝素。（楊琰譯 薛張綱校）

BACKGROUND: Heparin is the anticoagulant most commonly used for cardiopulmonary bypass (CPB), and the activated clotting time (ACT) is its primary monitor. In October 2009, the Food and Drug Administration changed the United States Pharmacopeia (USP) monograph for unfractionated heparin to incorporate new quality tests and a new potency assay and reference standard. This latter change was anticipated by in vitro tests to reduce heparin potency by 10% in each USP unit dose. After integration of the "new" heparin into our practice, we subjectively noticed less prolongation of the ACT with our routine heparin bolus before the initiation of CPB. We performed this investigation to provide objective evidence of a reduction in the level of anticoagulation achieved with use of the new heparin as assessed by ACT values and to document the occurrence of having an ACT below our institutional threshold before the initiation of CPB.
METHODS: A retrospective chart review was performed on all children who underwent CPB at Children's Healthcare of Atlanta between July 1, 2008, and June 30, 2009, before the release of the new heparin ("old heparin" [OH] group) and between June 1, 2010, and May 31, 2011, after complete integration of the new heparin ("new heparin" [NH] group). Baseline ACTs and ACTs after the administration of 400 U/kg of heparin were recorded for both the OH and NH groups. We determined the number of patients in each group having an ACT <480 seconds after the initial heparin bolus but before the initiation of CPB. Additionally, patients were divided into 3 age groups (<1 month, 1 to 12 months, and >1 year) to analyze similar ACT changes.

RESULTS: Postheparin ACTs were significantly lower in the NH group than in the OH group. There were significantly more patients having an ACT <480 seconds after the initial heparin bolus in the NH group (OH: 68 of 557 [12.2%] versus NH: 140 of 491 patients [28.5%]; P < 0.0001). The change remained significant when assessed across the age groups.
CONCLUSIONS: In this investigation we provide objective evidence that the level of anticoagulation after the initial pre-CPB heparin bolus as assessed by the ACT is significantly less with use of the new heparin. This reduction remained consistent across 3 age groups and was associated with a more frequent occurrence of ACTs below our institutional threshold for the initiation of CPB. Consideration should be given to increasing the initial weight-based heparin dose administered before CPB

腎移植麻醉中腹橫肌平面阻滯：一項隨機對照研究

Transversus Abdominis Plane Block for Analgesia in Renal Transplantation: A Randomized Controlled Trial

Noelle M. Freir, MB, FCARCSI, Caitriona Murphy, MB, FCARCSI, Mohan Mugawar, MB, FCARCSI, FRCA, Anna Linnane, MB and Anthony J. Cunningham, MD, FCARCSI, FANZCA, FRCPC
From the Department of Anaesthesia, Beaumont Hospital, Dublin, Ireland.
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背景：腹橫肌平面阻滯（TAP）已被證實能有效減少阿片類藥物的使用量和降低包括下腹部等部位手術的疼痛評分。在此項研究中，我們評估了腹橫肌平面阻滯在進行屍體腎移植的終末期腎衰患者中的有效性。
方法：65位成年腎移植受體隨機分爲兩組，一組採用全身麻醉複合20ml 0.375%左旋布比卡因的腹橫肌平面阻滯，另一組採用全身麻醉複合20ml 0.9%生理鹽水的空白阻滯。每組都採用嗎啡自控鎮痛和口服對乙醯氨基酚。在麻醉復蘇室和術後2、4、6、12、24小時，進行患者評估。主要結果是腎移植後第一個24小時內嗎啡使用總量。其他評估結果包括疼痛評分，噁心嘔吐、過度鎮靜和呼吸抑制的發生率。
結果：嗎啡的使用量在兩組間無差別，TAP組31.6±5.6mg，對照組32.6±5.5mg（95%可信區間[CI]：-8.96至7.09，P=0.817）。疼痛評分在術後任何時間點也無明顯差別。噁心發生率在TAP組爲53%，在對照組爲24%。發生與治療相關的噁心的相對危險度爲2.2（95% CI：1.1至4.3，P=0.017）。沒有患者出現過度鎮靜和呼吸抑制。
結論：腎移植的鎮痛方案中增加腹橫肌平面阻滯並不能減少嗎啡的用量。
（郁玲玲譯 薛張綱校）

BACKGROUND: The transversus abdominis plane (TAP) block has proven effective in reducing opioid requirements and pain scores for some procedures involving the lower abdominal wall. In this study we assessed its efficacy in patients with end-stage renal failure undergoing cadaveric renal transplantation.
METHODS: Sixty-five adult renal transplant recipients were prospectively randomized to receive a standard general anesthetic technique supplemented with levobupivacaine 0.375% 20 mL TAP block or sham block with 20 mL 0.9% saline. Both groups received patient-controlled morphine analgesia and acetaminophen . Patient assessment occurred in the postanesthetic care unit and at 2, 4, 6, 12, and 24 hours. The primary outcome was total morphine consumption in

the first 24 hours after renal transplantation. Other outcomes assessed included pain scores, presence of nausea or vomiting, excesusive sedation, and respiratory depression.
RESULTS: Morphine requirements did not differ between the 2 groups, 31.6 _ 5.6 mg in the TAP group and 32.6 _ 5.5 mg in the control group (95% confidence interval [CI], _8.96 to 7.09, P _0.817). Pain scores also did not differ significantly at any time point after surgery. Nausea was reported in 53% of the TAP group and 24% of the control group. The relative risk of nausea associated with treatment was 2.2 (95% CI, 1.1 to 4.3, P _ 0.017). No patient exhibited excessive sedation or respiratory depression.
CONCLUSIONS: The addition of a TAP block to the analgesia regimen for renal transplantation did not reduce morphine requirements.

簡報：腰叢阻滯減少髖關節鏡術後疼痛：一項前瞻性隨機對照試驗。

Brief report: lumbar plexus blockade reduces pain after hip arthroscopy: a prospective randomized controlled trial.

Jacques T. YaDeau, MD, PhD*, Tiffany Tedore, MD‡, Enrique A. Goytizolo, MD*, David H. Kim, MD*, Douglas S. T. Green, MD*, Anna Westrick, MD*, Randall Fan, MD‡, Matthew C. Rade, BA*, Anil S. Ranawat, MD†§, Struan H. Coleman, MD, PhD† and Bryan T. Kelly, MD†§

From the Departments of *Anesthesiology and †Orthopaedic Surgery, Hospital for Special Surgery; and Departments of ‡Anesthesiology and §Orthopaedic Surgery, New York–Presbyterian Hospital, Weill Cornell Medical College, New York, New York.
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背景：髖關節鏡會導致中度至重度術後疼痛。我們假設腰叢神經阻滯（LPB）將減少手術當天出院回家的患者在麻醉後監護室（PACU）內產生術後疼痛。
方法：患者接受硬膜外阻滯聯合靜脈注射鎮靜劑，昂丹司瓊和酮咯酸。有一半的患者（n =42）通過 LPB 單次注射了布比卡因。術後鎮痛（PACU 和出院後）提供口服氨酚氫可酮（5/500 毫克）和非甾體類抗炎藥物。有需要時，可在 PACU 靜脈注射氫嗎啡酮。
結果：LPB 減少在 PACU 的靜息痛（GEE：在 0 至 10 範圍內的平均 β 估計值爲-0.9；95％可信區間爲-1.7 至-0.1，P = 0.037）。由於 LPB，平均 PACU 靜息痛評分從 4.2 降低到 3.3（P = 0.048，95％可信區間差異爲 0.007 至 1.8；採用獨立樣本 t 檢驗進行初步評估比較組間疼痛，未糾正每個患者的多個數值）。在 PACU 使用鎮痛藥、PACU 疼痛與活動及病人舒適度這三個方面，無顯著統計學差異。沒有長期的不良事件的發生，但有 2 個 LPB 病人在 PACU 浴室跌倒，無損傷。有 3 個未預期的病人入院；一個 LPB 病人是因硬膜外藥物擴散和尿瀦留入院。有兩個對照組患者入院，一個是因爲血氧飽和度下降，另一個是因爲疼痛和噁心。
結論：LPB 能在統計學上顯著減少髖關節鏡術後在 PACU 發生的靜息痛，但是並沒有明顯改善最次要的結果，表明 LPB 風險和利益的評估應該個體化。
（周玲譯 薛張綱校）

BACKGROUND: Hip arthroscopy causes moderate to severe postoperative pain. We hypothesized that performance of a lumbar plexus block (LPB) would reduce postoperative pain in the postanesthesia care unit (PACU) for patients discharged home on the day of surgery.
METHODS: Patients received a combined spinal epidural with IV sedation, ondansetron, and ketorolac. Half of the patients (n = 42) also underwent a single-injection bupivacaine LPB.

Postoperative analgesia (PACU and after discharge) was provided with oral hydrocodone/acetaminophen (5/500 mg) and an oral nonsteroidal antiinflammatory drug. IV hydromorphone was given as needed in the PACU.
RESULTS: The LPB reduced pain at rest in the PACU (GEE: β estimate of the mean on a 0 to 10 scale = -0.9; 95% confidence interval = -1.7 to -0.1; P = 0.037). Mean PACU pain scores at rest were reduced by the LPB from 4.2 to 3.3 (P = 0.048, 95% confidence interval for difference = 0.007-1.8; uncorrected for multiple values per patient, using independent samples t test for preliminary evaluation comparing pain between the groups). There were no statistically significant differences in PACU analgesic usage, PACU pain with movement, and patient satisfaction. No permanent adverse events occurred, but 2 LPB patients fell in the PACU bathroom, without injury. Three unplanned admissions occurred; one LPB patient was admitted for epidural spread and urinary retention. Two control patients were admitted, one for oxygen desaturation and one for pain and nausea.

CONCLUSION: LPB resulted in statistically significant reductions in PACU resting pain after hip arthroscopy, but the absence of improvement in most secondary outcomes suggests that assessment of risks and benefits of LPB should be individualized.

二尖瓣的前位觀：定義和獲得

En Face View of the Mitral Valve: Definition and Acquisition

Feroze Mahmood, MD*, Haider Javed Warraich, MD*, Sajid Shahul, MD*, Aisha Qazi, MD*, Madhav Swaminathan, MD†, G. Burkhard Mackensen, MD, PhD†, Peter Panzica, MD*and Andrew Maslow, MD‡
From the *Department of Anesthesia, Critical Care and Pain Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, Massachusetts; †Department of Anesthesia, Duke University Medical College, Durham, North Carolina; and ‡Department of Anesthesia, The Warren Alpert Medical School of Brown University, Providence, Rhode Island.
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二尖瓣的 3 維立體心超觀被稱爲“前位觀”或“外科觀”，它所呈現的二尖瓣的視圖接近于外科醫生從左房角度觀察到的二尖瓣。儘管這個視圖的解剖學標誌已經被很好的定義了，但是還沒有全面的心超定義。在回顧了文獻以後，我們提供二尖瓣左房和左室前位觀的定義。我們也討論了用於獲得這個視圖的技術。
（唐瑩 譯 馬皓琳 李士通 校）
A 3-dimensional echocardiographic view of the mitral valve, called the “en face” or “surgical view,” presents a view of the mitral valve similar to that seen by the surgeon from a left atrial perspective. Although the anatomical landmarks of this view are well defined, no comprehensive echocardiographic definition has been presented. After reviewing the literature, we provide a definition of the left atrial and left ventricular en face views of the mitral valve. Techniques used to acquire this view are also discussed.

白天與夜晚應用氯胺酮和戊巴比妥對大鼠松果體褪黑素分泌和運動行爲的晝夜節律的不同影響

Day or Night Administration of Ketamine and Pentobarbital Differentially Affect Circadian Rhythms of Pineal Melatonin Secretion and Locomotor Activity in Rats

Takahiro Mihara, MD*, Tatsuaki Kikuchi, MD*, Yoshinori Kamiya, MD, PhD†, Motokazu Koga, MD*, Kazuhiro Uchimoto, MD*, Kiyoyasu Kurahashi, MD*and Takahisa Goto, MD*
From the Departments of *Anesthesiology and Critical Care Medicine, and †Neuroanatomy, Yokohama City University Graduate School of Medicine, Yokohama, Japan.
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背景：手術和全身麻醉會影響病人的晝夜節律，可能導致術後睡眠障礙和譫妄。然而，不同麻醉藥物在靜息-活動週期中不同時相的應用如何影響晝夜節律尚未明確。我們假設戊巴比妥（一種 γ-氨基丁酸 A 受體拮抗劑）和氯胺酮（一種 *N*-甲基-d-天門冬氨酸受體拮抗劑）對晝夜節律有不同影響，並且這些作用還受藥物應用時相（靜息比活動時相）的影響。

方法：大鼠按照給予的麻醉藥（戊巴比妥或氯胺酮）和腹腔內給藥時間（活動/夜晚時相或休息/白天時相）的不同分成四組。大鼠接受全身麻醉和微透析導管植入後，讓其經歷五天的光照/黑暗（12/12小時）週期，通過線上松果體微透析法，我們分析了松果體褪黑素分泌和運動行爲的節律。應用余弦分析法對資料節律性進行分析。

結果：休息時相應用氯胺酮組在麻醉後第一天的褪黑素分泌和運動行爲節律方面分別提前65和153分鐘。相反，活動時相應用氯胺酮組分別延遲43和235分鐘。戊巴比妥不管在哪個時相給藥，都對褪黑素分泌或運動行爲的節律沒有影響。在活動時相給藥時，兩種藥物都會降低麻醉後褪黑素分泌的幅度；然而在休息時相給藥時兩種藥物對幅度均無影響。麻醉後3天裡所有動物的運動行爲幅度均降低。

結論：通過不同時相給藥，氯胺酮對於晝夜節律有相反的時相轉換效應，而戊巴比妥則沒有此效應。而且兩種藥物在 24 小時的休息-活動週期中活動時相應用時均可降低術後松果體褪黑素分泌的幅度，而在休息時相給藥時則無此效應。

（張怡 譯 馬皓琳 李士通校）

BACKGROUND: Surgery with general anesthesia disturbs circadian rhythms, which may lead to postoperative sleep disorders and delirium in patients. However, it is unclear how circadian rhythms are affected by different anesthetics administered at different times during the rest-activity cycle. We hypothesized that pentobarbital (an agonist at the γ-aminobutyric acid A receptors) and ketamine (an antagonist at the *N*-methyl-d-aspartate receptors) would have differential effects on circadian rhythms, and these effects would also be influenced by the time of their administration (the active versus resting phase).

METHODS: Rats were divided into 4 groups according to the anesthetic administered (pentobarbital or ketamine) and the timing of intraperitoneal administration (active/night phase or resting/day phase). Using online pineal microdialysis, we analyzed pineal melatonin secretion and locomotor activity rhythms in rats under a light/dark (12/12-hour) cycle for 5 days after anesthesia and microdialysis catheter implantation. The data were analyzed for rhythmicity by cosinor analysis.

RESULTS: Ketamine administered during the resting phase produced 65- and 153-minute phase advances, respectively, in melatonin secretion and locomotor activity rhythms on the first day after anesthesia. In contrast, ketamine administered during the active phase produced 43- and 235-minute phase delays. Pentobarbital had no effect on the phase of either melatonin secretion or locomotor activity, irrespective of the timing of administration. When administered during the

active phase, both anesthetics decreased the amplitude of melatonin secretion on the day after anesthesia; when administered during the resting phase, however, neither anesthetic affected the amplitude. The amplitude of locomotor activity decreased in all animals for 3 days after anesthesia.
CONCLUSION: Ketamine has opposite phase-shifting effects on circadian rhythms according to the time of administration, whereas pentobarbital has no effect. Furthermore, both anesthetics decrease the postoperative amplitude of pineal melatonin secretion if administered during the active, but not the resting, phase of the 24-hour rest-activity cycle.

普瑞巴林對有神經性疾病的小鼠脾細胞的免疫調節作用

The Immunomodulatory Effect of Pregabalin on Spleen Cells in Neuropathic Mice

Yeon Jang, MD, PhD, Ho-Kyung Song, MD, PhD, Mi Young Yeom, BS and Dae Chul Jeong, MD, PhD
From The Catholic University of Korea, Medical College, Seoul, South Korea.
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背景：疼痛與免疫功能之間有著密切的關係。外周神經損傷後神經性疼痛的發展與損傷部位的炎症一起發生。T 淋巴細胞反應，作爲細胞介導的免疫反應的一部分，已牽涉在外周神經痛的發病機理和疼痛進程中。普瑞巴林[（S）-3 -（氨甲基）-5 - 甲基己酸]，作爲抗癲癇藥物被開發，在臨床和實驗室方面它已經顯示出用於神經性疼痛的療效。爲了評估普瑞巴林對免疫調節的可能影響，我們在神經性疾病小鼠模型中評估了自然殺傷（NK）細胞針對 YAC-1鼠淋巴細胞和植物血凝素刺激的 T 淋巴細胞增殖反應的殺腫瘤活性。
方法：通過雄性 BALB/c 小鼠右側坐骨神經的慢性縮窄性損傷（CCI）來誘導神經病模型。用一個動態足底觸覺計衡量機械性痛覺過敏。確認痛覺過敏後，從手術後第2天開始口服給予容量爲10 mL/kg 的普瑞巴林或生理鹽水（對照組）總量爲10 mL/kg，劑量爲30 mg/kg，每天兩次。術後第7天，測定 NK 細胞的細胞毒性和脾細胞增殖反應。使用乳酸脫氫酶法評估 NK 細胞活性。把不同數量的效應細胞加入到100μL 含有1×10^4目標 YAC-1細胞的威爾斯微量滴定板的井孔中，以達到最終的效應物對靶細胞比例爲80:1、40:1和20:1。通過檢測溴去氧尿苷來測定脾細胞對植物血凝素的增殖反應。基於溴去氧尿苷整合入細胞 DNA 的測定，計算刺激指數，以確定細胞增殖數量。對於體外研究中，測定不同濃度的普瑞巴林（3、10和30μg/mL）時 NK 細胞活性及分離脾細胞的增殖。
結果：在第7天 CCI 引起明顯的機械性異常性疼痛，而口服普瑞巴林逆轉機械性痛覺過敏。 CCI 小鼠中的 NK 細胞活性及脾細胞增殖較對照組小鼠顯著增加。在 CCI 小鼠中，普瑞巴林治療顯著抑制 NK 細胞活性及脾細胞增殖。在對照組小鼠中 NK 細胞活性爲8.4％±4.7％，在 CCI 小鼠中爲29.2％±20.2％；普瑞巴林治療可以降低 CCI 小鼠中的細胞毒性至6.8％±2.4％。在 CCI 組中，刺激指數爲169％±71％，但與對照組相比，普瑞巴林治療使其降低至67％±52％。在體外，當普瑞巴林濃度≥10μg/ mL（P <0.05）時，NK 細胞的活性被抑制。
結論：神經性疼痛增強了免疫反應，而普瑞巴林治療可調節該反應。普瑞巴林的治療抑制了 NK 細胞的活性和脾細胞增殖反應的增加。
（余亦南 譯 馬皓琳 李士通 校）
BACKGROUND: There is a strong relationship between pain and immune function. The development of neuropathic pain after peripheral nerve damage occurs with inflammation at the

injury site. T lymphocyte function, a part of cell-mediated immunity, has been implicated in the pathogenesis and nociceptive processing of peripheral neuropathic pain. Pregabalin [(*S*)-3-(aminomethyl)-5-methylhexanoic acid], which was developed as an antiepileptic drug, has shown clinical and laboratory efficacy for neuropathic pain. To assess the possible influence of pregabalin therapy on immunomodulation, we assessed natural killer (NK) tumoricidal activity against YAC-1 murine lymphoma cells and phytohemagglutinin-stimulated T lymphocyte proliferation in a neuropathic mouse model.

METHODS: The neuropathic model was induced by chronic constriction injury (CCI) to the right sciatic nerve in male BALB/c mice. Mechanical hyperalgesia was measured with a dynamic plantar aesthesiometer. After confirming hyperalgesia, pregabalin or saline (for control mice) in a volume of 10 mL/kg was administered orally at a dosage of 30 mg/kg, twice daily from day 2 after surgery. On day 7 postsurgery, NK cell cytotoxic activity and splenocyte proliferation were measured. NK cell activity was assessed by lactate dehydrogenase assay. Various numbers of effector cells were added to the wells of a microtiter plate containing 1×10^4 target YAC-1 cells in 100 μL, to achieve final effector-to-target cell ratios of 80:1, 40:1, and 20:1. The proliferative response of splenocytes to phytohemagglutinin was measured by bromodeoxyuridine detection. Stimulation index was calculated to quantify cell proliferation based on the measurement of bromodeoxyuridine incorporation in cellular DNA. For in vitro study, NK cell activity and splenocyte proliferation from isolated spleen cells were determined at different concentrations of pregabalin (3, 10, and 30 μg/mL).

RESULTS: CCI caused marked mechanical allodynia on day 7 and orally administered pregabalin reversed mechanical hyperalgesia. NK cell activity and splenocyte proliferation were significantly increased in CCI mice compared with control mice. Pregabalin treatment in CCI mice significantly suppressed NK cell activity and proliferation of splenocytes. NK cell activity was 8.4% ± 4.7% in control and 29.2% ± 20.2% in CCI mice; pregabalin treatment reduced cytotoxicity to 6.8% ± 2.4% in CCI mice. Stimulation index was 169% ± 71% in CCI mice but pregabalin treatment reduced it to 67% ± 52% compared with control. In vitro, NK cell activity was suppressed at a pregabalin concentration of ≥10 μg/mL ($P < 0.05$).

CONCLUSIONS: Neuropathic pain increased immunological reactivity and pregabalin treatment modulated this reactivity. Increased NK cell activity and splenocyte proliferation were inhibited by pregabalin treatment.

腹部手術圍術期高氧濃度吸氧後長期死亡率增加：一個隨機臨床試驗的隨訪

Increased Long-Term Mortality After a High Perioperative Inspiratory Oxygen Fraction During Abdominal Surgery: Follow-Up of a Randomized Clinical Trial

Christian S. Meyhoff, MD, PhD*, Lars N. Jorgensen, MD, DMSc†, Jørn Wetterslev, MD, PhD‡, Karl B. Christensen, PhD§, Lars S. Rasmussen, MD, PhD, DMSc*and PROXI Trial Group

From the *Department of Anaesthesia, Centre of Head and Orthopaedics, Copenhagen University Hospital, Rigshospitalet, Copenhagen, Denmark; †Department of Surgery K, Bispebjerg Hospital, University of Copenhagen, Copenhagen, Denmark; ‡Copenhagen Trial Unit, Centre for Clinical Intervention Research, Rigshospitalet, Copenhagen University Hospital, Copenhagen, Denmark; and §Department of Biostatistics, University of Copenhagen, Copenhagen, Denmark.

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背景：已有研究建議圍術期高濃度吸氧（80%）可預防術後傷口感染。然而，最近的最大試驗之一——PROXI 試驗未發現手術部位感染有減少，且吸 80%氧的患者 30 天死亡率較高。在 PROXI 試驗的這項隨訪研究中，本文評估了行腹部手術的患者中長期死亡率與圍術期高濃度吸氧的相關性。

方法：從 2006 年 10 月 8 日至 2006 年 10 月 6 日，1386 名擇期或急診行剖腹手術的患者隨機分配到術中及術後 2 小時接受 80%或 30%氧氣組。隨訪日期爲 2010 年 2 月 24 日。採用 Kaplan-Meier 統計及 Cox 比例危險率模型分析生存率。

結果：在中位數爲 2.3 年（範圍 1.2-3.4 年）的隨訪期後從 1386 例中的 1382 例患者得到生存狀態。80%氧氣組 685 例患者中 159 例（23.2%）死亡，而 30%氧氣組 701 例中 128 例（18.3%）死亡（HR，1.30[95%置信區間，1.03-1.64,]，*P*=0.03）。癌症手術患者 HR 爲 1.45；95%置信區間爲 1.10-1.90；*P*=0.009；非癌症手術後 HR 爲 1.06；95%置信區間爲 1.69-1.65；*P*=0.79。

結論：圍術期接受 80%氧氣的患者長期死亡率顯著增加，且這在行癌症手術的患者中有統計學顯著性意義，而在非癌症手術患者中無統計學顯著性意義。

（許辛 譯，馬皓琳，李世通 校）

BACKGROUND: A high perioperative inspiratory oxygen fraction (80%) has been recommended to prevent postoperative wound infections. However, the most recent and one of the largest trials, the PROXI trial, found no reduction in surgical site infection, and 30-day mortality was higher in patients given 80% oxygen. In this follow-up study of the PROXI trial we assessed the association between long-term mortality and perioperative oxygen fraction in patients undergoing abdominal surgery.

METHODS: From October 8, 2006, to October 6, 2008, 1386 patients underwent elective or emergency laparotomy and were randomized to receive either 80% or 30% oxygen during and for 2 hours after surgery. The follow-up date was February 24, 2010. Survival was analyzed using Kaplan-Meier statistics and the Cox proportional hazards model.

RESULTS: Vital status was obtained in 1382 of 1386 patients after a median follow-up of 2.3 years (range 1.3 to 3.4 years). One hundred fifty-nine of 685 patients (23.2%) died in the 80% oxygen group compared to 128 of 701 patients (18.3%) assigned to 30% oxygen (HR, 1.30 [95% confidence interval, 1.03 to 1.64], *P* = 0.03). In patients undergoing cancer surgery, the HR was 1.45; 95% confidence interval, 1.10 to 1.90; *P* = 0.009; and after noncancer surgery, the HR was 1.06; 95% confidence interval, 0.69 to 1.65; *P* = 0.79.

CONCLUSIONS: Administration of 80% oxygen in the perioperative period was associated with significantly increased long-term mortality and this appeared to be statistically significant in patients undergoing cancer surgery but not in noncancer patients.

重症監護室內對患者全身體迴圈血管順應性、應力容積和心功能曲線的床旁評價

Bedside Assessment of Total Systemic Vascular Compliance, Stressed Volume, and Cardiac Function Curves in Intensive Care Unit Patients

Jacinta J. Maas, MD*, Michael R. Pinsky, MD, Dr hc, MCCM, FCCP†, Leon P. Aarts, MD, PhD‡and Jos R. Jansen, PhD*

From the Departments of *Intensive Care and ‡Anesthesiology, Leiden University Medical Center, Leiden, The Netherlands; and †Department of Critical Care, University of Pittsburgh, Pittsburgh, Pennsylvania.
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背景：，對依賴呼吸機支持的患者行吸氣屏氣操作時通過床旁微創監測可測量體循環平均充盈壓（$Pmsf_{hold}$），作爲心輸出量–中心靜脈壓曲線的零流量攔截。我們比較了吸氣屏氣操作時的體循環平均充盈壓與血管閉塞時的上肢血管平衡壓（$Pmsf_{arm}$），以及對它們對通過血管內補液管理評價全身血管順應性（Csys）和應力容積的能力。
方法：對心臟手術術後機械通氣患者，在正常血流量和每次輸注50ml 膠體之後（連續10次）在不同氣道壓力下行吸氣屏住操作以及上肢血流停流操作。在輸液管理每一步時，我們測量了中心靜脈壓、血管閉塞時的上肢血管的平衡壓、每搏輸出量和心輸出量以構建中心靜脈壓/心輸出量（心功能）曲線和容積變化/體循環平均充盈壓變化（順應性）曲線。輸液管理前後測量吸氣屏氣操作時的體循環平均充盈壓。通過外推體循環平均充盈壓-容積曲線零壓力攔截來測定應力容積。
結果：共15例入選本研究。吸氣屏氣操作時的體循環平均充盈壓和血管閉塞時的上肢血管的平衡壓有密切相關性。 全身血管順應性呈線性關係（64.3±32.7 mL ·mm Hg^{-1}，0.97±0.49 mL ·mm Hg^{-1} ·kg^{-1}預測體重）。應力容積估計爲1265±541ml（預計總血容量的28.5％±15％）。增加>12%的容量至超過500ml（容量反應）時，患者的心功能曲線是陡峭的，而其餘患者的心功能曲線是平緩的。
結論：全身血管順應性、應力容積和心功能曲線並可以在床邊測得，並可以被用來描述病人血流動力學狀態的特徵。
（方斌 譯 馬皓琳 李士通校）

BACKGROUND: Mean systemic filling pressure (Pmsf) can be measured at the bedside with minimally invasive monitoring in ventilator-dependent patients using inspiratory hold maneuvers ($Pmsf_{hold}$) as the zero flow intercept of cardiac output (CO) to central venous pressure (CVP) relation. We compared $Pmsf_{hold}$ with arm vascular equilibrium pressure during vascular occlusion ($Pmsf_{arm}$) and their ability to assess systemic vascular compliance (Csys) and stressed volume by intravascular fluid administration.
METHODS: In mechanically ventilated postoperative cardiac surgery patients, inspiratory holds at varying airway pressures and arm stop-flow maneuvers were performed during normovolemia and after each of 10 sequential 50-mL bolus colloid infusions. We measured CVP, $Pmsf_{arm}$, stroke volume, and CO during fluid administration steps to construct CVP to CO (cardiac function) curves and ΔvolumeΔPmsf (compliance) curves. $Pmsf_{hold}$ was measured before and after fluid administration. Stressed volume was determined by extrapolating the Pmsf-volume curve to zero pressure intercept.
RESULTS: Fifteen patients were included. $Pmsf_{hold}$ and $Pmsf_{arm}$ were closely correlated. Csys was linear (64.3 ± 32.7 mL ·mm Hg^{-1}, 0.97 ± 0.49 mL ·mm Hg^{-1} ·kg^{-1} predicted body weight). Stressed volume was estimated to be 1265 ± 541 mL (28.5% ± 15% predicted total blood volume). Cardiac function curves of patients with an increase of >12% to 500 mL volume extension (volume responsive) were steep, whereas the cardiac function curves of the remaining patients were flat.
CONCLUSIONS: Csys, stressed volume, and cardiac function curves can be determined at the bedside and can be used to characterize patients' hemodynamic status.

可視喉鏡在產科麻醉中表現的回顧性研究

A Retrospective Study of the Performance of Video Laryngoscopy in an Obstetric Unit

Michael F. Aziz, MD, Diana Kim, MD, Jeffrey Mako, MD, Karen Hand, MD, FRCA and Ansgar M. Brambrink, MD, PhD
From the Department of Anesthesiology & Perioperative Medicine, Oregon Health & Science University, Portland, OR.
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本研究評價了在產科麻醉中使用可視喉鏡進行氣管插管的表現。我們分析了三年內的氣道管理細節，並觀察了 180 例氣管插管。所有病例均使用直接喉鏡法或可視喉鏡法。直接喉鏡法首次插管成功率爲 157/163（95%可信區間[CI]爲 92%-99%），失敗一次。可視喉鏡法首次插管成功率爲 18/18（95%CI 爲 81%-100%）。失敗的直接喉鏡法氣管插管通過可視喉鏡法補救成功。使用可視喉鏡法插管的患者往往需進行急診手術，並且 18 例患者中有 16 例預計存在直接喉鏡法插管困難。可視喉鏡可能是產科氣道管理的一種有效輔助工具，它在困難氣道管理方案中的作用尚需進一步研究。
（陳彬彬譯 馬皓琳 李士通校）

We evaluated the performance of tracheal intubation using video laryngoscopy in an obstetric unit. We analyzed airway management details during a 3-year period, and observed 180 intubations. All cases were managed with direct or video laryngoscopy. Direct laryngoscopy resulted in 157 out of 163 (95% confidence interval [CI], 92%–99%) first attempt successful intubations and failed once. Video laryngoscopy resulted in 18 of 18 (95% CI, 81%–100%) successful intubations on first attempt. The failed direct laryngoscopy was rescued with video laryngoscopy. The patients managed with video laryngoscopy frequently required urgent or emergency surgery and had predictors of difficult direct laryngoscopy in 16 of 18 cases. Video laryngoscopy may be a useful adjunct for obstetric airway management, and its role in this difficult airway scenario should be further studied.

術中使用氯胺酮能否減輕術後的炎症反應？系統回顧和薈萃分析

Does Intraoperative Ketamine Attenuate Inflammatory Reactivity Following Surgery? A Systematic Review and Meta-Analysis

Ola Dale, MD, PhD*†‡, Andrew A. Somogyi, MSc, PhD*, Yibai Li, BHSc (Hon)*, Thomas Sullivan, BMa, CompSc (Hon) ‖ and Yehuda Shavit, PhD*¶
From *Discipline of Pharmacology, Faculty of Health Sciences, University of Adelaide, Adelaide, Australia; †Department of Circulation and Medical Imaging, Pain and Palliation Research Group, Norwegian University of Science and Technology, Trondheim, Norway; ‡Department of Anaesthesia and Emergency Medicine, St. Olav's University Hospital, Trondheim, Norway; ‖ Discipline of Public Health, Faculty of Health Sciences, University of Adelaide, Adelaide, Australia; ¶Department of Psychology, Hebrew University, Jerusalem, Israel.
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背景：關於麻醉藥物氯胺酮減輕術後炎症反應的能力的報導都不一致。在本系統回顧中，我們通過白細胞介素-6濃度的評價來檢測圍術期給予氯胺酮對術後炎症反應的影響。

方法：本研究是基於 PubMed、Scopus、Web of Knowledge 和 the Cochrane Library 中的一個系統搜索。用英語寫的在人類身上進行的隨機對照試驗均符合要求。爲了包括在分析中，結果必須與炎症反應或免疫調節有關。每項研究由2名評定人員獨立回顧。根據 GRADE 的方法對資料進行分析，並按照 PRISMA 推薦規範進行報導。
結果：14項研究有資格進行評估（684例）。手術在全身麻醉下進行，在術前或術中使用不同劑量的氯胺酮。8項研究涉及心肺分流手術，4項腹部手術，1項胸外科手術，1項白內障手術。3項研究被視爲低品質。 9項研究檢測了 IL-6在術後6個小時內的濃度。但在3項研究中，在術前或術中使用了其他有效的抗炎藥物，因此6項研究（n=331）被列入薈萃分析。根據術後 IL-6濃度的結果，氯胺酮具有抗炎的作用；薈萃分析顯示，平均術前-術後 IL-6的濃度差（95％置信區間）爲-71（-101～-41）pg/ml。
結論：可以得出結論，術中給予氯胺酮能顯著抑制術後早期 IL-6介導的炎症反應。未來的研究應該進一步探討氯胺酮在大手術中的抗炎作用，確定氯胺酮治療是否改變功能性的結果，闡明其抗炎作用的機制，並提出適當的給藥方案。
（崔曉娜 譯 馬皓琳 李士通 校）

BACKGROUND: Reports regarding the ability of the anesthetic drug ketamine to attenuate the inflammatory response to surgery are conflicting. In this systematic review we examined the effect of perioperative ketamine administration on postoperative inflammation as assessed by concentrations of the biomarker interleukin-6 (IL-6).
METHODS: This study was based on a systematic search in PubMed, Scopus, Web of Knowledge, and the Cochrane Library. English written randomized controlled trials conducted in humans were eligible. To be included in the analysis, outcome had to relate to inflammation or immune modulation. Each study was reviewed independently by 2 assessors. Data were analyzed according to the GRADE's approach and reported in compliance with the PRISMA recommendations.
RESULTS: Fourteen studies were eligible for evaluation (684 patients). Surgery was performed under general anesthesia, and ketamine was given before or during the surgery in varied doses Eight studies involved cardiopulmonary bypass operations, 4 were for abdominal surgery, 1 thoracic surgery, and 1 cataract surgery. Three studies were deemed of low quality. Nine studies measured IL-6 concentrations within the first 6 hours postoperatively; but in 3 studies, other potent anti-inflammatory drugs were used as premedication or during the operation; thus 6 studies (n = 331) were included in the meta-analysis. Using postoperative IL-6 concentrations as an outcome, ketamine had an anti-inflammatory effect; the meta-analysis showed a mean preoperative–postoperative IL-6 concentration difference (95% confidence interval) of −71 (−101 to −41) pg/mL.
CONCLUSIONS: It can be concluded that intraoperative administration of ketamine significantly inhibits the early postoperative IL-6 inflammatory response. Future studies should further examine the anti-inflammatory effect of ketamine during major surgery, determine whether ketamine treatment alters functional outcomes, elucidate the mechanisms of its anti-inflammatory effect, and suggest an appropriate dosing regimen.

白藜蘆醇調節 NMDA 受體表達，並抑制嗎啡耐受大鼠的神經炎症反應

Resveratrol Regulates *N*-Methyl-d-Aspartate Receptor Expression and Suppresses Neuroinflammation in Morphine-Tolerant Rats

Ru-Yin Tsai, PhD*†, Kuang-Yi Chou, PhD†, Ching-Hui Shen, MD,PhD‡, Chih-Cheng Chien, MD,PhD*, Wei-Yuan Tsai, MS§, Ya-Ni Huang, PhD ‖ , Pao-Luh Tao, PhD¶, Yaoh-Shiang Lin, MD#and Chih-Shung Wong, MD,PhD**
From the *Department of Anesthesiology, Cathay General Hospital, Taipei; †General Education Center, National Taipei University of Nursing and Health Sciences, Taipei; ‡Department of Anesthesiology, Veterans General Hospital, Taichung; §Institute of Life Science, National Defense Medical Center, Taipei; ‡Department of Nursing, Hsin Sheng College of Medical Care and Management, Taoyuan; ¶National Health Research Institutes, Miaoli; #Department of Otolaryngology–Head and Neck Surgery, Tri-Service General Hospital and National Defense Medical Center, Taipei; and **Graduate Institute of Medical Science, National Defense Medical Center, Taipei, Taiwan.
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背景：本研究目的是確定中草藥-白藜蘆醇對減輕大鼠嗎啡耐受的作用及機制。
方法：在雄性 Wista 大鼠鞘內放置兩根導管，一根導管連接微量滲透泵，用於輸注嗎啡(15 μg/h)或生理鹽水（1 μL/h），連續 5 天。第五天，停止輸注嗎啡輸注後即刻，白藜蘆醇(7.5、15、30 或 60 μg)、二甲亞碸(5 μL)、或生理鹽水 (5 μL)經另一根鞘內導管注射至鞘內。3 小時後嗎啡（15μg 在 5 μL 生理鹽水中）經鞘內給予。在嗎啡挑戰後 120 分鐘裡，每隔 30 分鐘對所有大鼠進行一次感受傷害的甩尾試驗。
結果：長時間輸注嗎啡可引起抗傷害反應性耐受及耐受的脊髓背角突觸小體部分中 NMDA 受體亞基 NR1 及 NR2B 的表達上調。白藜蘆醇預處理可使嗎啡在嗎啡耐受大鼠中產生顯著的鎮痛作用，這與其逆轉嗎啡耐受大鼠脊髓的突觸小體部分中 NR1 及 NR2B 亞基上調有關。給予 NR1/NR2B 特異性拮抗劑艾芬地爾可以產生與白藜蘆醇類似的作用。此外，白藜蘆醇預處理還可抑制嗎啡耐受大鼠脊髓中突觸後密度-95/NR1/NR2B 複合物免疫沉澱的增加。而且，嗎啡長期輸注可啓動神經膠質細胞，引起嗎啡耐受大鼠脊髓中促炎細胞因數包括腫瘤壞死因數-α，白介素-1β 及白介素-6 mRNA 表達增加，嗎啡挑戰前使用白藜蘆醇預處理可抑制這些效應。
結論：白藜蘆醇可通過抑制神經炎症反應和下調 NMDAR NR1 and NR2B 亞基的表達來減輕嗎啡耐受。白藜蘆醇調節 NMDAR 的表達可能與引起支架突觸後密度-95蛋白的缺失有關。
（邱鬱薇 譯 馬皓琳 李士通 校）
BACKGROUND: In the present study, we examined the effects and mechanisms of the Chinese herb resveratrol on attenuation of morphine tolerance in rats.
METHODS: Male Wistar rats were implanted with 2 intrathecal catheters; one catheter was connected to a mini-osmotic pump, used for either morphine (15 μg/h) or saline (1 μL/h) infusion for 5 days. On day 5, resveratrol (7.5, 15, 30, or 60 μg), dimethyl sulfoxide (5 μL), or saline (5 μL) was injected via the other catheter immediately after the discontinued morphine infusion. Three hours later, intrathecal morphine (15 μg in 5 μL saline) was given. All rats received the nociceptive tail-flick test every 30 minutes for 120 minutes after the morphine challenge.
RESULTS: Long-term morphine infusion induced antinociceptive tolerance and up-regulated *N*-methyl-d-aspartate receptor (NMDAR) subunit NR1 and NR2B expression in the synaptosome fraction of the tolerant spinal cord dorsal horn. Resveratrol pretreatment provided a significant antinociceptive effect of morphine in morphine-tolerant rats, and it was associated with reversal

of the up-regulated NR1 and NR2B subunits in the synaptosome fraction of morphine-tolerant rat spinal cords. NR1/NR2B-specific antagonist ifenprodil treatment produced a similar effect as that of resveratrol. Furthermore, an increase of postsynaptic density-95/NR1/NR2B complex immunoprecipitation in morphine-tolerant rat spinal cord was also inhibited by resveratrol pretreatment. Moreover, chronic morphine infusion activated glial cells with an increase of proinflammatory cytokine tumor necrosis factor-α, interleukin-1β, and interleukin-6 mRNA expression in morphine-tolerant rat spinal cords and these effects were suppressed by resveratrol pretreatment before the morphine challenge.
CONCLUSIONS: Resveratrol attenuates morphine tolerance by inhibiting neuroinflammation and down-regulating NMDAR NR1 and NR2B subunit expression. Resveratrol regulates the NMDAR expression, which might be involved in a loss of scaffolding postsynaptic density-95 protein.

超聲引導下的肌間溝臂叢神經阻滯中 1.5%甲呱卡因和 0.5%布比卡因的注入順序不會影響阻滯起效的潛伏時間及鎮痛的持續時間

The Sequence of Administration of 1.5% Mepivacaine and 0.5% Bupivacaine Does Not Affect Latency of Block Onset or Duration of Analgesia in Ultrasound-Guided Interscalene Block

Jeff Gadsden, MD, FRCPC, FANZCA, Ali Shariat, MD, Admir Hadzic, MD, PhD, Daquan Xu, MB, MPH, Vijay Patel, MD and Thomas Maliakal, MD
From the Department of Anesthesiology, St. Luke's–Roosevelt Hospital Center, New York, New York.
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背景：在外周神經阻滯時，可先後給予不同的局麻藥。爲了使阻滯能快速起效同時有較長的持續時間，典型的做法是在長效局麻藥之前給予短效或者中效局麻藥。然而，關於這種給藥順序的優點的資料卻很少。在超聲引導下的肌間溝阻滯時，我們先後混合使用了甲呱卡因及布比卡因，並假定注入兩種藥物的順序不會影響達到的神經阻滯的臨床效果。
方法：64 名行肩關節鏡手術的患者（年齡 18-65 歲，ASA 分級 I-II 級），只接受單次注射超聲引導下的肌間溝臂叢神經阻滯。隨機將受試者分成兩組，分別接受以下兩種局麻藥給藥順序中的一種：A 組先注入 1.5%甲呱卡因 15mL，再注入 0.5%布比卡因 15mL；B 組相同的局麻藥但順序相反。主要觀察指標爲感覺和運動阻滯的持續時間，同時評估神經阻滯的起效時間。
結果：A 組及 B 組在運動阻滯持續時間上未見明顯差異（10.1± 4.7 小時比 10.3 ± 5.1 小時，平均差異 0.2 小時，95%可信區間[CI] −3.3~2.9，*P* = 0.9）。鎮痛持續時間在 A 組及 B 組間也相似（9.5 ± 5.6 小時比 10.2 ± 4.5 小時，平均差異 0.7 小時，95%CI -3.2~1.9)，*P* = 0.42）。兩組在感覺阻滯的起效時間上也得到相似結果（A 組：15.9 ± 7.1 分鐘；B 組：13.9 ± 7.0 分鐘，平均差異 1.9 分鐘，95%CI −1.4~5.2，*P* = 0.25）。
結論：在超聲引導下的肌間溝臂叢神經阻滯中，15mL 的 1.5%甲呱卡因及 15mL 的 0.5%布比卡因的注入順序不會對阻滯的起效及持續時間產生有意義的臨床影響。
（王贇 譯 馬皓琳 李士通 校）

BACKGROUND: During peripheral nerve blockade, different local anesthetics may be sequentially administered. Typically, a short- or intermediate-acting local anesthetic is

administered before a long-acting local anesthetic to achieve a block with rapid onset and long duration. However, there is a paucity of data on advantages of such sequencing. We hypothesized that when using a sequential mixture of mepivacaine and bupivacaine for ultrasound-guided interscalene block, the order of injection of the drugs does not influence the clinical characteristics of the block achieved.

METHODS: Sixty-four patients undergoing arthroscopic shoulder surgery (aged 18–65 years; ASA physical status I–II) with a single-injection ultrasound-guided interscalene brachial plexus block as sole anesthetic were studied. The subjects were randomized to receive 1 of 2 local anesthetic sequences: 15 mL of mepivacaine 1.5% followed by 15 mL of bupivacaine 0.5% (group A), or the same local anesthetics in the reverse order (group B). The durations of sensory and motor block were the primary outcomes. Block onset was also assessed.

RESULTS: Duration of motor block was similar between group A and group B (10.1 ± 4.7 hours vs 10.3 ± 5.1 hours, mean difference 0.2 hours, 95% confidence interval [CI] −3.3 to 2.9, $P = 0.9$). Duration of analgesia was also similar between group A and group B (9.5 ± 5.6 hours vs 10.2 ± 4.5 hours, mean difference 0.7 hours, 95% CI −3.2 to 1.9, $P = 0.42$). Onset of sensory block was similar between the 2 groups (15.9 ± 7.1 minutes for group A, 13.9 ± 7.0 minutes for group B, mean difference 1.9 minutes, 95% CI −1.4 to 5.2, $P = 0.25$).

CONCLUSIONS: The sequence in which 15 mL mepivacaine 1.5% and 15 mL bupivacaine 0.5% are administered does not seem to have a clinically meaningful effect on duration or onset of ultrasound-guided interscalene brachial plexus block.