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40Mg和 60Mg高比重 2%丙胺卡因與 60Mg等比重 2%丙胺卡因比較用於門診手術中鞘內麻醉的一個前瞻、雙盲、隨機、臨床試驗

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一項觀察性研究——運用血栓彈力描記圖預測心臟手術術後過度失血

The Incremental Value of Thrombelastography for Prediction of Excessive Blood Loss After Cardiac Surgery: An Observational Study

Marcin Wasowicz, MD, Stuart A. McCluskey, MD, Duminda N. Wijeysundera, MD, Terrence M. Yau, MD, Massimiliano Meinri, MD, W. Scott Beattie, MD and Keyvan Karkouti, MD
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背景：準確的危險度分層對減少心臟手術術後過度失血有所幫助。在此項研究中作者在現有的危險預測模型基礎上，增加血栓彈力圖指標，觀察對心臟手術術後過度失血的預測是否有更大價值。
方法：434 例行體外迴圈（CPB）下心臟手術患者入組此項觀察性研究。在 CPB 前及 CPB 期間進行血栓彈力圖描記，術後過度失血的風險通過一個現有的危險預測模型來計算。患者在術後 5 天內禁用氯吡格雷及華法林。術後過度失血的定義為 CPB 結束至術後一天內輸注紅細胞≥5 單位。分別建立包含一個現有的危險預測模型疊加或不疊加血栓彈力描記法的 logistic 回歸模型。通過該實驗中資料曲線下面積和重評估的改善淨值來評估風險預測是否有所改良。
結果：在 434 例患者中 59 例發生術後出血量過多(13.6%)。唯一一項改善危險分層的為 CPB 期間血栓彈力描記圖的最大振幅，這一最大振幅反映了最大血凝塊彈力強度。雖然在預測模型中加入這一變數並未明顯影響曲線下面積(曲線下面積增加 0.780-0.784; P = 0.8)，但這一血栓彈力的變數使重評估的改善淨值增加了 12% (P = 0.05)，主要改善了對於那些高風險病例術後過度出血風險的診斷。
結論: 將 CPB 中的血栓彈力描記圖資料加入這一現存的患者-手術-相關變數的危險預測模型中可以改善心臟手術術後過度出血的危險預測分層，然而我們需要更為大量的多中心研究來證實這一發現以建立一個新的危險預測模型。
（趙嫣紅　譯　陳傑　校）
BACKGROUND: Accurate risk stratification 分層 may help reduce the burden 負擔 of excessive blood loss after cardiac surgery. We measured the incremental value of thrombelastography to an existing risk prediction model for excessive blood loss in cardiac surgery.
METHODS: This observational study included 434 patients who underwent cardiac surgery with cardiopulmonary bypass (CPB) and had thrombelastographic measures before and during CPB, their risk of excessive blood loss could be calculated with an existing risk prediction model and they had not received clopidogrel or warfarin within 5 days of surgery. Excessive blood loss was defined as transfusion of ≥5 U of red blood cells from termination of CPB to 1 day after surgery. Logistic regression models including an existing risk prediction model without and with thrombelastographic measures were constructed. Improvement in risk prediction was measured by the area under the curve and net reclassification improvement.
RESULTS: Excessive blood loss occurred in 59 of 434 patients (13.6%). The only thrombelastographic measure that improved risk stratification was maximum amplitude during CPB, which reflects maximum clot strength. Although the addition of this variable to the existing prediction model did not have a material effect on the area under the curve (increased from 0.780 to 0.784; *P* = 0.8), it did improve the net reclassification improvement by 12% (*P* = 0.05), primarily by improving the detection of high-risk cases.
CONCLUSIONS: Risk stratification for excessive blood loss after cardiac surgery is improved when on-CPB thrombelastography is added to an existing risk prediction model that incorporates readily 便捷的 available patient- and surgery-related variables, but large, multicenter trials are needed to verify this finding and create a new risk prediction model.

月經週期對喉鏡檢查及氣管內插管時血流動力學反應的影響

Brief Report: The Effects of the Menstrual Cycle on the Hemodynamic Response to Laryngoscopy and Tracheal Intubation

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此項研究的目的為確定月經週期對氣管插管（TI）血流動力學改變的影響。入組患者為 62 例 ASA 為 I 級的女性患者，根據處於何種月經週期分為兩組：卵泡期組（F 組）31 例及黃體期組（L 組）31 例。所有患者靜脈輸注丙泊酚及羅庫溴銨誘導下氣管插管。在靜脈輸注麻醉藥物前及 TI 後記錄患者血流動力學改變並且計算患者心率-收縮壓乘積。實驗結果：兩組患者人口學資料無顯著差異性，L 組的心率-收縮壓乘積在 TI 後一分鐘顯著增加且增加值高於 F 組(P < 0.001)。結論：女性患者處於何種月經週期對於 TI 後血流動力學反應是一項重要影響因素。

（趙嫣紅　譯　陳傑　校）

We designed this study to determine the effect of the menstrual cycle on the hemodynamic response to tracheal intubation (TI). Sixty-two ASA I women who were either in the follicular phase (group F, *n* = 31) or luteal phase (group L, *n* = 31) of their menstrual cycle were included in the study. Patients received propofol and rocuronium for intubation. Hemodynamic variables were recorded before administration of the IV anesthetic, as well as after TI. Rate pressure products were calculated. Groups were similar in terms of demographic data. Rate pressure products values at the first minute after TI were significantly increased in group L than were those in group F (*P* < 0.001). We conclude that the phase of the menstrual cycle is an important factor in the hemodynamic response to TI.

評估麻醉消退期患者的瑞芬太尼－七氟醚響應曲面模型：應用七氟醚效應室濃度的改良模型

An Evaluation of Remifentanil-Sevoflurane Response Surface Models in Patients Emerging from Anesthesia: Model Improvement Using Effect-Site Sevoflurane Concentrations

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簡介：作者曾報導瑞芬太尼-七氟醚減弱疼痛刺激的協同作用的特別模型。本文初步評估了該模型對麻醉消退的預測作用，以及患者恢復室需要鎮痛時脛骨壓力反應的預測。作者假設，模型的預測與觀察到的反應相一致。同時假設在非穩態條件下，對七氟醚效應室濃度和呼吸末濃度之間的滯後時間的計算能夠提高預測能力。
方法：20 例患者應用七氟醚-瑞芬太尼-芬太尼複合麻醉。麻醉恢復中以兩種方法記錄預測能力，即以呼氣末濃度為基礎或以效應室濃度為基礎。同樣記錄患者在恢復室初次需要鎮痛藥物時，兩種方法對於傷害性刺激的反應的預測能力。在時間和空間兩方面對模型的預測和實際觀察進行比較。
結果：當患者麻醉時，模型預測結果對大部分患者沒有反應（≥99％），顯示出較高的似然比。然而，麻醉結束後，在消退期模型出現了寬泛的預測（1％～97％）。雖然預測較寬泛，基於效應室濃度的預測，比呼吸末濃度為基礎的預測，有一更好的分佈百分比。對於呼氣末濃度為基礎的模式，50％模型預測可能沒有反應的患者中，45％患者在 2min 內蘇醒，而 65％患者 4min 時蘇醒。以效應室濃度為基礎的模型中，50％模型預測可能沒有反應的患者中，45％在 1min 內蘇醒，而 85％在 3.2min 內蘇醒。基於效應室和呼氣末濃度兩種預測模式，恢復室中對於疼痛刺激反應的預測大致相同。
討論：結果證實了作者研究假說的一部分；七氟醚效應室濃度和呼氣末濃度之間滯後時間的計算，提高了預測能力，但對恢復室中傷害性刺激的反應的預測沒有影響。這些模型臨床意義在於預測活動可能有效，今後需進行大規模評估以利於此模型的完善。
（懷曉蓉　譯　陳傑　校）
INTRODUCTION: We previously reported models that characterized the synergistic interaction between remifentanil and sevoflurane in blunting responses to verbal and painful stimuli. This preliminary study evaluated the ability of these models to predict a return of responsiveness during emergence from anesthesia and a response to tibial pressure when patients required analgesics in the recovery room. We hypothesized that model predictions would be consistent with observed responses. We also hypothesized that under non-steady-state conditions, accounting for the lag time between sevoflurane effect-site concentration (Ce) and end-tidal (ET) concentration would improve predictions.
METHODS: Twenty patients received a sevoflurane, remifentanil, and fentanyl anesthetic. Two model predictions of responsiveness were recorded at emergence: an ET-based and a Ce-based prediction. Similarly, 2 predictions of a response to noxious stimuli were recorded when patients first required analgesics in the recovery room. Model predictions were compared with observations with graphical and temporal analyses.
RESULTS: While patients were anesthetized, model predictions indicated a high likelihood that patients would be unresponsive (≥99%). However, after termination of the anesthetic, models exhibited a wide range of predictions at emergence (1%–97%). Although wide, the Ce-based predictions of responsiveness were better distributed over a percentage ranking of observations than the ET-based predictions. For the ET-based model, 45% of the patients awoke within 2 min of the 50% model predicted probability of unresponsiveness and 65% awoke within 4 min. For the Ce-based model, 45% of the patients awoke within 1 min of the 50% model predicted probability of unresponsiveness

and 85% awoke within 3.2 min. Predictions of a response to a painful stimulus in the recovery room were similar for the Ce- and ET-based models.
DISCUSSION: Results confirmed, in part, our study hypothesis; accounting for the lag time between Ce and ET sevoflurane concentrations improved model predictions of responsiveness but had no effect on predicting a response to a noxious stimulus in the recovery room. These models may be useful in predicting events of clinical interest but large-scale evaluations with numerous patients are needed to better characterize model performance.

健康志願者中平痛新對於寒顫增益和最大強度的效應

The Effects of Nefopam on the Gain and Maximum Intensity of Shivering in Healthy Volunteers

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背景：亞低溫已被證實可以改善心臟驟停後神經功能的預後。平痛新，作用於中樞，具有非鎮靜性鎮痛，降低寒顫的閾值，而無血管收縮作用，從而可能成為合適的治療性低溫的誘導藥。然而，除了閾值，寒顫的增益和最大強度也為一個藥物的體溫調節特性，對於臨床都很重要。因此，作者擬評價應用兩個不同劑量的平痛新和安慰劑時的寒顫增益和最大強度。
方法：7 例健康志願者隨機分成 3 個研究日：（1）對照組（生理鹽水），（2）小劑量平痛新（50 ng/mL），（3）大劑量的平痛新（100ng/mL）。在所有研究日，對志願者通過中心靜脈輸注冷的液體，使得平均皮膚溫度維持在 31℃。記錄鼓膜的中心體溫。寒顫的閾值，增益和最大強度，通過耗氧量進行評估。
結果：50ng/mL 和 100 ng/mL 平痛新均顯著降低寒顫的閾值和增益：寒顫閾值：35.6 ℃± 0.2℃（對照組）; 35.2 ℃± 0.3℃（小劑量）; 34.9℃± 0.5℃（大劑量），P 值 0.004;寒顫增益：597 ± 235 mL · min^{-1} · $°C^{-1}$（對照組）；438 ± 178 mL · min^{-1} · $°C^{-1}$（小劑量）; 301 ± 134 mL · min^{-1} · $°C^{-1}$（大劑量），P 值 0.028。三種治療之間寒顫的最大強度沒有顯著性差異。
結論：平痛新顯著降低寒顫增益。這一減少結合了寒顫閾值的降低，將允許臨床醫師在需要低溫治療可以給患者進一步降溫。
（懷曉蓉　譯　陳傑　校）

BACKGROUND: Mild hypothermia has been shown to improve neurologic outcome after cardiac arrest. Nefopam, a centrally acting, nonsedative analgesic, decreases the threshold of shivering, but not vasoconstriction, and thus might be a suitable drug for induction of therapeutic hypothermia. However, not only the threshold but also the gain and maximum intensity of shivering define the thermoregulatory properties of a drug and thus are clinically important. Therefore, we evaluated the gain and maximum intensity of shivering at 2 different doses of nefopam and placebo.
METHODS: Seven healthy volunteers were randomly assigned to 3 study days: (1) control (saline), (2) small-dose nefopam (50 ng/mL), and (3) large-dose nefopam (100

ng/mL). On all study days volunteers were cooled using central venous infusion of cold IV fluid while mean skin temperature was maintained at 31°C. Core temperature was recorded at the tympanic membrane. Threshold, gain, and maximum intensity of shivering were evaluated using oxygen consumption.
RESULTS: Both 50 and 100 ng/mL nefopam significantly reduced the shivering threshold as well as the gain of shivering: shivering threshold: 35.6°C ± 0.2°C (control); 35.2°C ± 0.3°C (small dose); 34.9°C ± 0.5°C (large dose), $P = 0.004$; gain of shivering: 597 ± 235 mL · min^{-1} · $°C^{-1}$ (control); 438 ± 178 mL · min^{-1} · $°C^{-1}$ (small dose); 301 ± 134 mL · min^{-1} · $°C^{-1}$ (large dose), $P = 0.028$. Maximum intensity of shivering did not differ among the 3 treatments.
CONCLUSIONS: Nefopam significantly reduced the gain of shivering. This reduction, in combination with a reduced shivering threshold, will allow clinicians to cool patients even further when therapeutic hypothermia is indicated.

Airway Scope 和 Macintosh 喉鏡在躺在地上患者氣管插管的比較

Airway Scope and Macintosh Laryngoscope for Tracheal Intubation in Patients Lying on the Ground

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背景：對躺在地上患者行直接喉鏡較為困難，原因在於插管者頭部遠高於患者頭部，難以使插管者視軸線和患者氣管軸線成一直線。Airway Scope 是一種使用時不要求口、咽、氣管三軸對齊，方便于氣管插管的喉鏡。作者假設 Airway Scope 較傳統 Macintosh 喉鏡更適用於躺在地上患者的插管。
方法：入組對象為成年外科手術患者。麻醉誘導後，使用直接喉鏡插管並評價氣道特徵。患者隨機分為 Airway Scope 插管組（n=50）或 Macintosh 插管組（n＝50）。插管者站在與手術床平齊的桌子上行氣管插管，以模擬躺在地上插管情景。另一非盲的觀察者記錄總體插管成功率、插管時間、嘗試次數及插管相關氣道併發症。其中插管時間是主要評估指標。
結果：總體插管成功率分別為：Airway Scope 組 98%，Macintosh 組 100%。Airway Scope 組（平均 18 秒，標準差 4 秒）的插管時間較 Macintosh 組（平均 35 秒，標準差 16 秒）快 17 秒。兩組嘗試時間相似。兩組氣道併發症相似，均無低氧（SpO_2 <95%）發生。
結論：對於有經驗的操作者，使用 Airway Scope 或 Macintosh 喉鏡對充分肌松條件下仰臥位的躺在地上患者行氣管插管均有較高的成功率。但 Airway Scope 插管時間更短。
（於章傑　譯　陳傑　校）
BACKGROUND: Direct laryngoscopy of a patient lying on the ground is difficult because the intubator's head is far above the head of the patient, making alignment of the

intubator's visual axis with the patient's tracheal axis difficult. The Airway Scope is a laryngoscope designed to facilitate tracheal intubation without requiring alignment of the oral, pharyngeal, and tracheal axes. We thus tested the hypothesis that intubation with the Airway Scope is faster than with the Macintosh laryngoscope in subjects lying on the ground.

METHODS: Adult surgical patients were enrolled. After anesthesia induction, direct laryngoscopy was performed and airway characteristics noted. Patients were randomly assigned to tracheal intubation by either the Airway Scope (n = 50) or the Macintosh laryngoscope (n = 50). The intubator performed tracheal intubation from a table positioned at the same height as that of the operating table, thus simulating intubating on the ground. An unblinded observer recorded overall intubation success rate, time required for intubation, the number of attempts required for successful intubation, and airway complications related to intubation. Of these, the primary end point was time required for intubation.

RESULTS: Overall intubation success rates were 98% with the Airway Scope and 100% with the Macintosh laryngoscope. Intubation was 17 s faster with the Airway Scope (mean, 18 (SD, 4) seconds) versus the Macintosh laryngoscope (35 (16) seconds). The number of intubation attempts was similar with each device. The incidences of airway complications were similar, with no hypoxia (SpO_2 <95%) occurring in either group.

CONCLUSIONS: Both the Airway Scope and the Macintosh laryngoscope offer high success rates in adequately prepared paralyzed patients lying supine at ground level in the hands of a skilled practitioner. However, the Airway Scope facilitated faster tracheal intubation.

ICU 鎮痛、鎮靜及譫妄治療指南化可改善疼痛和亞譫妄發生率

Protocolized Intensive Care Unit Management of Analgesia, Sedation, and Delirium Improves Analgesia and Subsyndromal Delirium Rates

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背景：ICU 的鎮靜藥、鎮痛藥使用，尤其當劑量達到患者意識改變時可導致譫妄和死亡。ICU 病人可監測疼痛、煩亂和譫妄。這些症狀以相關治療指南出臺為分界，分為指南前（PRE）和指南後（PRE）。比較兩個時期的鎮痛鎮靜水準、昏迷譫妄發生率、停留時間、轉入社區康復治療率和死亡率。作者假設減少醫源性昏迷可能降低譫妄發生率，因為兩個疾病似乎是有聯繫的。

方法: 入組患者為連續病例，分別為進入 ICU 指南前組(2003 年 8 月至 2004 年 2 月,610 名患者)和指南後組(2005 年 4 月至 2005 年 11 月,604 名患者)。在 2004 年 2 月至 2005 年 4 月期間，試點並進行個體化非藥理學策略和基於鎮靜、鎮痛和譫妄評分的鎮痛、鎮靜、抗精神病藥物滴定法給藥的培訓。測定的預後指標分別為：昏迷、譫妄、住院時間、死亡率和轉入社區康復治療率。

結果：指南後組得益於較好的鎮痛，相比指南前組（90.72 ± 207.45 嗎啡等效量/天），阿片藥物使用量更少(22.93 ± 40.36 嗎啡等效量/天) (*P* = <0.0001)。儘管兩組鎮靜狀態類似，指南後組有更短的機械通氣時間。 指南後組的藥物相關昏迷發生率(18.1%vs 7.2%, *P* < 0.0001)更低，ICU 和住院時間更少，出院時依賴度更低。亞譫妄顯著減少；譫妄發生類似。30 天死亡危險率兩組分別為：29.4%（指南前）vs 22.9%（指南後）(對數秩檢驗, P = 0.009)。

結論：經過初步綜合系統管理的治療指南培訓，包括非藥物處理、個體化鎮靜鎮痛藥物應用和個體化譫妄治療，可帶來更好的預後。

（於章傑　譯　陳傑　校）

BACKGROUND: Sedatives and analgesics, in doses that alter consciousness in the intensive care unit (ICU), contribute to delirium and mortality. Pain, agitation, and delirium can be monitored in ICU patients. These symptoms were noted before (PRE) and after (POST) a protocol to alleviate undesirable symptoms. Analgesia and sedation levels, the incidence of coma, delirium, length of stay (LOS), discharge location, and mortality were then compared. We hypothesized that the likely reduction in iatrogenic coma would result in less delirium, because these 2 morbid conditions seem to be linked.
METHODS: All patients were consecutively admitted to an ICU PRE-protocol (August 2003 to February 2004, 610 patients) and POST-protocol (April 2005 to November 2005, 604 patients). Between February 2004 and April 2005, we piloted and taught individualized nonpharmacologic strategies and titration of analgesics, sedatives, and antipsychotics based on sedation, analgesia, and delirium scores. We measured the following outcomes: coma, delirium, LOS, mortality, and discharge location.
RESULTS: The POST group benefited from better analgesia, received less opiates (90.72 ± 207.45 vs 22.93 ± 40.36 morphine equivalents/d, *P* = <0.0001), and, despite comparable sedation, had shorter duration of mechanical ventilation. Medication-induced coma rates (18.1%vs 7.2%, *P* < 0.0001), ICU and hospital LOS, and dependency at discharge were lower in the POST-protocol group. Subsyndromal delirium was significantly reduced; delirium was similar. The 30-day mortality risk in the PRE cohort was 29.4% vs 22.9% in the POST cohort (log-rank test, *P* = 0.009).
CONCLUSION: Educational initiatives incorporating systematic management protocols with nonpharmacologic measures and individualized titration of sedation, analgesia, and delirium therapies are associated with better outcomes.

術中應用右美托咪定對接受扁桃體和腺樣體切除術的小兒的術後鎮痛和鎮靜效應

The Effect of Intraoperative Dexmedetomidine on Postoperative Analgesia and Sedation in Pediatric Patients Undergoing Tonsillectomy and Adenoidectomy

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背景：扁桃體切除術和腺樣體切除術是小兒外科最常見的手術，而這些手術後即刻的處理通常非常困難。此時經常伴有劇烈的疼痛，但由於術後氣道水腫以及對呼

吸抑制劑阿片類藥物的敏感性增加，容易導致氣道梗阻和低氧血症的發生。一種處理方法是通過應用非甾體類抗炎藥以減少阿片類藥物的使用量，但此類手術後應用非甾體類抗炎藥容易引起術後出血增加。右美托咪定有輕微的鎮痛作用，發揮鎮靜作用時不會引起呼吸抑制，而且對凝血功能沒有影響。作者設計了一項前瞻性、雙盲、隨機對照研究以證實術中應用右美托咪定對接受扁桃體切除術和腺樣體切除術的小兒的術後恢復的作用，包括術後鎮痛、鎮靜和血流動力學。

方法：109 位患兒隨機分為 4 組，分別在氣管內插管後 10min 後給予右美托咪定 0.75ug/kg、右美托咪定 1ug/kg、嗎啡 50ug/kg 或者嗎啡 100ug/kg。

結果：4 組患者在人口統計學、ASA 分級、術後阿片類藥物需要量、鎮靜評分、麻醉後復蘇室內供氧時間以及入室至轉出 PACU 時間方面沒有明顯的統計學差異。術後首次需要鎮痛的平均時間在右美托咪定（1ug/kg）組和嗎啡（100ug/kg）組的患兒沒有明顯的差異，但是與右美托咪定 0.75ug/kg 組和嗎啡 50ug/kg 組患兒相比，前者明顯長於後者（P<0.01）。此外，右美托咪定 0.75ug/kg 組患兒其術後需要大於 1 次追加鎮痛劑量的患者的數量明顯多於右美托咪定 1ug/kg 組和嗎啡 100ug/kg 組的患兒，但與嗎啡 50ug/kg 組患兒沒有明顯差異。與應用嗎啡的患兒相比，應用右美托咪定的患兒其術後首個 30min 內心率明顯低於應用嗎啡的患兒（P<0.05）。各組間患兒的鎮靜評分沒有明顯的差異。

結論：在接受扁桃體切除術的患兒中，無論術中應用右美托咪定還是嗎啡，其術後鎮痛阿片類藥物的總需要量相似。然而，右美托咪定 1ug/kg 組和嗎啡 100ug/kg 組在術後鎮痛方面更有優勢，表現在患兒術後首次需要鎮痛的時間明顯較長，並且術後需要追加鎮痛藥物的劑量更少，且並不增加在 PACU 內停留的時間。

（周姝婧　譯　陳傑　校）

BACKGROUND: The immediate postoperative period after tonsillectomy and adenoidectomy, one of the most common pediatric surgical procedures, is often difficult. These children frequently have severe pain but postoperative airway edema along with increased sensitivity to the respiratory-depressant effects of opioids may result in obstructive symptoms and hypoxemia. Opioid consumption may be reduced by nonsteroidal antiinflammatory drugs, but these drugs may be associated with increased bleeding after this operation. Dexmedetomidine has mild analgesic properties, causes sedation without respiratory depression, and does not have an effect on coagulation. We designed a prospective, double-blind, randomized controlled study to determine the effects of intraoperative dexmedetomidine on postoperative recovery including pain, sedation, and hemodynamics in pediatric patients undergoing tonsillectomy and adenoidectomy.

METHODS: One hundred nine patients were randomized to receive a single intraoperative dose of dexmedetomidine 0.75 μg/kg, dexmedetomidine 1 μg/kg, morphine 50 μg/kg, or morphine 100 μg/kg over 10 minutes after endotracheal intubation.

RESULTS: There were no significant differences among the 4 groups in patient demographics, ASA physical status, postoperative opioid requirements, sedation scores, duration of oxygen supplementation in the postanesthetic care unit, and time to discharge readiness. The median time to first postoperative rescue analgesic was similar in patients receiving dexmedetomidine 1 μg/kg and morphine 100 μg/kg, but significantly longer compared with patients receiving dexmedetomidine 0.75 μg/kg or morphine 50 μg/kg ($P < 0.01$). In addition, the number of patients requiring >1 rescue analgesic dose was

significantly higher in the dexmedetomidine 0.75 μg/kg group compared with the dexmedetomidine 1 μg/kg and morphine 100 μg/kg groups, but not the morphine 50 μg/kg group. Patients receiving dexmedetomidine had significantly slower heart rates in the first 30 minutes after surgery compared with those receiving morphine ($P < 0.05$). There was no significant difference in sedation scores among the groups.
CONCLUSIONS: The total postoperative rescue opioid requirements were similar in tonsillectomy patients receiving intraoperative dexmedetomidine or morphine. However, the use of dexmedetomidine 1 μg/kg and morphine 100 μg/kg had the advantages of an increased time to first analgesic and a reduced need for additional rescue analgesia doses, without increasing discharge times.

在沙灘椅位或側臥位實施的肩關節鏡檢查術中通過近紅外光譜法評估腦氧去飽和事件

Cerebral Oxygen Desaturation Events Assessed by Near-Infrared Spectroscopy During Shoulder Arthroscopy in the Beach Chair and Lateral Decubitus Positions

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背景：在沙灘椅位（BCP）接受肩部手術的患者可因腦缺血而有發生神經系統併發症的危險。因此，作者試圖尋求在 BCP 或側臥位（LCP）接受肩關節鏡檢查的患者中發生腦低去飽和事件（CDEs）的發生率。
方法：124 位在 BCP（61 位）或 LDP（63 位）位接受擇期肩關節鏡檢查的患者中收集實驗資料。所有患者均接受標準化麻醉。用近紅外光譜法定量區域腦組織氧飽和度（$SctO_2$）。在患者改變體位前，測得患者的基礎心率、平均動脈壓、動脈氧飽和度和 $SctO_2$，然後在術中每隔 3min 間斷監測。當 $SctO_2$ 低於臨界閾值（較基礎值下降 20%或者絕對值≤55%長於 15s）定義為 CDE，此時，以術前制定的方案給予治療。記錄術中發生 CDE 的次數，以及應對低 $SctO_2$ 的干預類型。同時評估術中 CDEs 和術後恢復不良的相關性。
結果：LDP 組患者更多地實施了肌間溝阻滯，除此之外，BCP 組和 LCP 組患者的麻醉方式相似。兩組患者術中血流動力學變數沒有明顯的差異。術中 BCP 組患者的 $SctO_2$ 更低（P<0.0001）。BCP 組患者 CDEs 的發生率更高（BCP 組 80.3%，LDP 組 0%），每位患者發生 CDEs 的次數也更多（BCP 組均次：4，間距：0-38 次，LDP 組均次 0,間距：0-0 次；均 P<0.0001）。在所有未接受肌間溝阻滯的患者中，術中發生 CDEs 的患者其噁心和嘔吐的發生率（50.0%和 27.3%）明顯高於術中未發生 CDEs 的患者（6.7%和 3.3%）（P=0.0001 和 P=0.011）。
結論：相比於 LDP 位，BCP 位實施肩部手術會顯著增加腦氧飽和度降低的發生率。
（周姝婧　譯　陳傑　校）

BACKGROUND: Patients undergoing shoulder surgery in the beach chair position (BCP) may be at risk for adverse neurologic events due to cerebral ischemia. In this investigation, we sought to determine the incidence of cerebral desaturation events (CDEs) during shoulder arthroscopy in the BCP or lateral decubitus position (LDP).
METHODS: Data were collected on 124 patients undergoing elective shoulder arthroscopy in the BCP (61 subjects) or LDP (63 subjects). Anesthetic management was standardized in all patients. Regional cerebral tissue oxygen saturation ($SctO_2$) was quantified using near-infrared spectroscopy. Baseline heart rate, mean arterial blood pressure, arterial oxygen saturation, and $SctO_2$ were measured before patient positioning and then every 3 minutes for the duration of the surgical procedure. $SctO_2$ values below a critical threshold (≥20% decrease from baseline or absolute value ≤55% for >15 seconds) were defined as a CDE and treated using a predetermined protocol. The number of CDEs and types of intervention used to treat low $SctO_2$ values were recorded. The association between intraoperative CDEs and impaired postoperative recovery was also assessed.
RESULTS: Anesthetic management was similar in the BCP and LDP groups, with the exception of more interscalene blocks in the LDP group. Intraoperative hemodynamic variables did not differ between groups. $SctO_2$ values were lower in the BCP group throughout the intraoperative period ($P < 0.0001$). The incidence of CDEs was higher in the BCP group (80.3% vs 0% LDP group), as was the median number of CDEs per subject (4, range 0–38 vs 0, range 0–0 LDP group, all $P < 0.0001$). Among all study patients without interscalene blocks, a higher incidence of nausea (50.0% vs 6.7%, $P = 0.0001$) and vomiting (27.3% vs 3.3%, $P = 0.011$) was observed in subjects with intraoperative CDEs compared with subjects without CDEs.
CONCLUSIONS: Shoulder surgery in the BCP is associated with significant reductions in cerebral oxygenation compared with values obtained in the LDP.

一項前瞻性隨機雙盲實驗：依他昔布和曲馬多用於擇期踇趾外翻術後鎮痛的比較

Pain Management After Elective Hallux Valgus Surgery: A Prospective Randomized Double-Blind Study Comparing Etoricoxib and Tramadol

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背景：日間手術後疼痛是常見的不適症狀，選擇性 COX-2 抑制劑的使用仍然存在爭議。在此次前瞻性隨機雙盲研究中，作者比較了依他昔布和曲馬多緩釋劑在擇期踇外翻手術術後鎮痛效果。
方法：100 例 ASAI-II 級女性患者隨機分為 2 組，每組 50 例，口服依他昔布前 4 天每天一次，每次 120mg，第 5 至第 7 天每天一次，每次 90mg，或者口服曲馬多緩釋片每天 2 次，每次 100mg，一共 7 天。術後第一個 7 天裏，對患者的疼痛、疼痛緩解、鎮痛滿意度、以及解救藥物使用進行評估。術後 12 周通過電腦斷層掃描評估骨的癒合情況。術後 16 周評估臨床預後（癒合情況，活動度，病人滿意度評估）。

結果：2 名患者在出院前退出，98 例患者，81 例 ASAI 級，17 例 ASAII 級（82 例不吸煙，14 例吸煙），平均年齡 49（19-65）歲，平均體重 64（47-83）kg，平均身高 167（154-183）cm。總體鎮痛效果良好，但依他昔布組的患者平均視覺類比評分（VAS）在整個 7 天的研究期間顯著低於另一組(12.5 ± 8.3 vs. 17.3 ± 11, $P < 0.05$)。且依他昔布組患者的疼痛緩解程度(92 ± 12 vs. 85 ± 15, $P < 0.05$)，對止痛藥的滿意度(47/49 vs. 39/49, $P < 0.05$)均更高。曲馬多組患者報告的副作用明顯較多，在所有曲馬多組的患者中，有 6 例因副作用而結束實驗($P < 0.05$)。術後 14 天，依他昔布組有 1 例，曲馬多組有 5 例患者出現傷口區域小面積刺激症狀。在術後 12 周通過電腦斷層掃描發現 82 例患者骨癒合良好，其中依他昔布組 43 例，曲馬多組 39 例。研究中發現有 11 例患者正在癒合中，其中依他昔布組 4 例，曲馬多組 7 例。術後 16 周患者對健康生活品質的評估顯示患者的整體滿意度較高。每組中各有 47 例患者評價為滿意。對生活品質的 VAS 評分平均值，依他昔布組 6.2，曲馬多組 2.6。術後 16 周的臨床隨訪顯示了較好的功能，也沒有任何病人有癒合不良的跡象或症狀。

結論：作為擇期踇外翻手術後多模式鎮痛的組成部分，依他昔布與曲馬多緩釋片相比，具有更有效，副作用更少的優點。目前還沒有與使用依他昔布相關的傷口或骨癒合不良的徵象。

（黃丹　譯　陳傑　校）

BACKGROUND: Pain is a common complaint after day surgery, and there is still a controversy surrounding the use of selective cyclooxygenase-2 (COX-2) inhibitors. In the present prospective, randomized, double-blind study we compared pain management with a selective (COX-2) inhibitor (etoricoxib) with pain management using sustained-release tramadol after elective hallux valgus surgery.

METHODS: One hundred ASA 1 to 2 female patients were randomized into 2 groups of 50 patients each; oral etoricoxib 120 mg × 1 × IV + 90 mg × 1 × day V–VII and oral tramadol sustained-release 100 mg × 2 × VII. Pain, pain relief, satisfaction with pain management, and need for rescue medication were evaluated during the first 7 postoperative days. A computed tomography scan evaluating bone healing was performed 12 weeks after surgery. A clinical evaluation of outcome (healing, mobility, and patient-assessed satisfaction) was performed 16 weeks after surgery.

RESULTS: Two patients withdrew before discharge from the hospital. Ninety-eight patients, 81 ASA 1 and 17 ASA 2 (82 nonsmokers and 14 smokers), mean age 49 years (19–65), weight 64 (47–83) kg, and height 167 (154–183) cm were evaluated. Overall pain was well managed, but the mean visual analog scale (VAS) was significantly lower among etoricoxib patients evaluated during the entire 7-day period studied (12.5 ± 8.3 vs. 17.3 ± 11, $P < 0.05$). patient's grading of pain relief (92 ± 12 vs. 85 ± 15, $P < 0.05$) and satisfaction with pain medication (47/49 vs. 39/49, $P < 0.05$) was higher among etoricoxib patients. Patients receiving tramadol reported significantly more side effects. Six patients, all in the tramadol group, discontinued the study because of side effects ($P < 0.05$). At 14-day follow-up 1 patient in the etoricoxib group and 5 patients in the tramadol group exhibited minor irritation in the wound area. The 12-week computed tomography scan showed good healing in 82 patients, 43 in the etoricoxib group, and 39 in the tramadol group. The study found ongoing healing in 11 patients, 4 in the etoricoxib group and 7 in the tramadol group. The 16-week patient-assessed Health Profile Quality

of life revealed high patient satisfaction overall; 47 patients in each study group rated the outcome as satisfactory and the mean change in the patient-assessed quality of life VAS score was 6.2 and 2.6 for the etoricoxib and tramadol groups, respectively. Clinical follow-up at 16 weeks showed high functionality and no signs or symptoms of improper healing in any patient.
CONCLUSION: Etoricoxib was found to be more effective and associated with fewer side effects in comparison with tramadol sustained release as a component of multimodel analgesia after elective hallux valgus surgery. There were no signs of impaired wound or bone healing associated with the use of etoricoxib.

超聲評價神經刺激儀引導下肘部正中神經阻滯：局麻藥的擴散、神經大小以及臨床療效的研究

An Ultrasonographic Assessment of Nerve Stimulation-Guided Median Nerve Block at the Elbow: A Local Anesthetic Spread, Nerve Size, and Clinical Efficacy Study

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背景：神經刺激是周圍神經阻滯的一種有效方法。然而，這種盲法下局麻藥（LA）的擴散仍未知，由此可解釋一些的臨床效應。
方法：100 例患者在神經刺激儀引導下進行了肘部正中神經阻滯。以最小刺激電流≤0.5 mA (2 Hz, 0.1ms)來確定針尖放置位置，後注入 1.5%利多卡因+1：200000 的腎上腺素 6ml。用一個線性 5-13MHz 的探頭（12L-RS）來測定正中神經的橫斷面，具體為：注射前後連續測量 3 次的橫截面積，並且觀察靜態和縱向的局麻藥向神經周圍擴散情況。神經內注射的定義是採用迭代方法測定出神經區域離群值的增加。將 3 個神經區域的運動阻滯和感覺測試（冷和輕觸）結果和影像學結果進行對比。在阻滯後的 3 天和 1 個月進行臨床神經檢測。
結果：43 例患者出現神經腫脹，橫截面積增加≥75%。37 例患者同時具有神經腫脹和局麻藥的環形擴散，其感覺阻滯成功率為 86%。沒有觀察到任何上述現象的 32 例病人中，感覺阻滯成功率為 34%。25 例病人無神經腫脹而有局麻藥環形擴散，在 30min 的觀察期內其感覺阻滯成功率為 76%。且沒有出現嚴重的神經系統併發症。
結論：神經刺激儀不能防止神經內注射，在未有神經內注射的情況下，若借助影像學觀察到局麻藥環形擴散現象，預示在 30min 觀察期內感覺阻滯的成功率將近 75％。
（黃丹 譯 陳傑　校）

BACKGROUND: Nerve stimulation is an effective technique for peripheral nerve blockade. However, the local anesthetic (LA) distribution pattern obtained with this blind approach is unknown and may explain its clinical effects.

METHODS: One hundred patients received a median nerve block at the elbow using a nerve stimulator approach. After correct needle placement defined by a minimal stimulating current ≤0.5 mA (2 Hz, 0.1 millisecond), 6 mL lidocaine 1.5%with epinephrine 1:200,000 was injected. A linear 5- to 13-MHz probe (12L-RS) was used to assess a cross-section area of median nerve, which was calculated by 3 consecutive measurements before and after injection, and LA circumferential spread around the nerve during static and longitudinal examination. Intraneural injection defined as an increase in nerve area was detected using an iterative method for outlier detection. Results of sensory tests (cold and light touch) on 3 nerve territories and of motor blockade were compared with the imaging aspects. We performed clinical neurological examination at 3 days and 1 month after block.
RESULTS: Nerve swelling, considered significant when an increase in cross-sectional area was ≥75%, was observed in 43 patients. Nerve swelling associated with a circumferential LA spread image, present in 37 patients, was associated with a sensory success rate of 86%. The success rate was 34% for 32 patients in whom none of these signs was visualized. A circumferential spread around a nonswollen nerve, present in 25 patients, was followed by a sensory success rate of 76% within the 30-minute evaluation period. No major early neurological complications were observed.
CONCLUSIONS: Nerve stimulation does not prevent intraneural injection. In the absence of intraneural injection, the presence of circumferential LA spread image seemed predictive of successful sensory block in almost 75% of the cases within the 30-minute evaluation period.

胸外科醫師協會和心血管麻醉醫師協會心臟手術臨床操作指南中圍術期輸血和血液保存對臨床操作的的影響

Effect of the Perioperative Blood Transfusion and Blood Conservation in Cardiac Surgery Clinical Practice Guidelines of the Society of Thoracic Surgeons and the Society of Cardiovascular Anesthesiologists upon Clinical Practices

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背景：2007 胸外科醫師協會和心血管麻醉醫師協會關於心臟手術圍術期輸血和血液保存的臨床操作指南最近被發佈，並受到很多關注。利用心臟外科麻醉醫師和灌注師的臨床實踐調查，我們旨在評估指南中所推薦的當前的灌注、麻醉和手術操作，同時確定指南對改變此類操作所起的作用。
方法：我們調查了心血管麻醉醫師協會、美國心血管灌注學會、加拿大臨床灌注協會和美國體外技術協會的非實習期成員，使用可檢驗臨床操作和對指南回饋的標準化的調查工具。
結果：共收回來自 1061 個機構（主要是美國的 677 個機構和加拿大的 34 個機構）的 1402 個調查，應答率為 32%。指南廣泛流傳于麻醉醫師和灌注師，78%的麻醉醫師和 67%的灌注師報告已經閱讀了指南的全部、部分或摘要。然而，僅 20%的應答者報告針對指南進行過機構內討論，14%的應答者報告已經組成了機構監控小組。應答者報告的現行的術前檢測、灌注、手術和藥理學實踐操作的差異性相當大。26%的應答者報告根據指南改變了一個或多個實踐。據報告所做的這些變化對減少整體輸血率存在高度（9%）或一點（31%）的效果。大於 5%的應答者報告，38 條指南推薦中只有 4 條已經根據指南被修改。
結論：本研究報導了心臟手術臨床實踐的廣泛差異。胸外科醫師協會/心血管麻醉醫師協會指南對於臨床實踐的改變僅發揮出了很小的作用。
（唐李雋 譯 馬皓琳 李士通 校）

BACKGROUND: The 2007 Society of Thoracic Surgeons and the Society of Cardiovascular Anesthesiologists Clinical Practice Guideline for Perioperative Blood Transfusion and Blood Conservation in Cardiac Surgery was recently promulgated and has received much attention. Using a survey of cardiac anesthesiologists and perfusionists' clinical practice, we aimed to assess the current practices of perfusion, anesthesia, and surgery, as recommended by the Guidelines, and to also determine the role the Guidelines had in changing these practices.
METHODS: Nontrainee members of the Society of Cardiovascular Anesthesiologists, the American Academy of Cardiovascular Perfusion, the Canadian Society of Clinical Perfusion, and the American Society of ExtraCorporeal Technology were surveyed using a standardized survey instrument that examined clinical practices and responses to the Guidelines.
RESULTS: A total of 1402 surveys from 1061 institutions principally in the United States (677 institutions) and Canada (34 institutions) were returned, a 32% response rate. There was wide distribution of the Guidelines with 78% of anesthesiologists and 67% of perfusionists reporting having read all, part, or a summary of the Guidelines. However, only 20% of respondents reported that an institutional discussion had taken place as a result of the Guidelines, and only 14% of respondents reported that an institutional monitoring group had been formed. There was wide variability in current preoperative testing, perfusion, surgical, and pharmacological practices reported by respondents. Twenty-six percent of respondents reported 1 or more practice changes in response to the Guidelines. The changes made were reported to be highly (9%) or somewhat (31%)

effective in reducing overall transfusion rates. Only 4 of 38 Guideline recommendations were reported by >5% of respondents to have been changed in response to the Guidelines. **CONCLUSIONS:** Wide variation in clinical practices of cardiac surgery was reported. Little change in clinical practices was attributed to the Society of Thoracic Surgeons/Society of Cardiovascular Anesthesiologists Guidelines.

評估 TEG®和 RoTEM®兩種方法在心臟手術患者的凝血彈性描記參數的臨床互換性

An Assessment of Clinical Interchangeability of TEG® and RoTEM® Thromboelastographic Variables in Cardiac Surgical Patients

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背景：床旁凝血彈性描記圖的使用越來越多，但是 2 種主要系統 TEG®（血分光鏡）和 RoTEM®（五角棱鏡）的臨床互換性評估還沒有進行過。
方法：我們用白陶土 TEG® (kaoTEG)、天然性 TEG® (natTEG®)、內源性 RoTEM® (inTEM)和外源性 RoTEM (exTEM)方法檢測了 46 名麻醉誘導後的心臟手術患者的血液樣本。每個檢測包括反應時間(R)、凝血時間 (K)、最大振幅(MA)和角度(α)。使用 Bland–Altman 點圖和混合模型分析。為了評估重複性，我們在 2 名志願者中進行了 7 次重複性的快速連續檢測。
結果：166 個檢測可用來進行分析。kaoTEG®的反應時間 (345 ± 102s, 平均數 ± 標準差)比 inTEM 的 (179 ± 74s, P < 0.001) 和 exTEM 的 (55 ± 28s, P < 0.001)長。kaoTEG®的凝血時間 (78 ± 18s)和 inTEM 的 (75 ± 52 s, P = 0.60)沒有明顯差異，但是比 exTEM 的凝血時間 (61 ± 24s, P < 0.003)要長。kaoTEG®的最大振幅 (71 ± 6.5 mm)大於 inTEM 的最大振幅 (67 ± 5.2 mm, P < 0.02)，而和 exTEM 的 (69 ± 6.3 mm) 相近。kaoTEG®的角度(72° ± 4.1°)和 inTEM (76° ± 7°)、exTEM (79° ± 4.5°)沒有顯著性差異。最大振幅和角度的變異度<10%。兩個裝置中反應時間和凝血時間的重複性很差，但是最大振幅和角度的重複性足夠滿足臨床目的。
結論：TEG®和 RoTEM®檢測方法在最大振幅和角度上相關性較好，而反應時間和凝血時間的相關性較差。kaoTEG®和 exTEM 兩種檢測方法有最好的一致性。因此 TEG®和 RoTEM®的測定結果不能夠完全互換，在臨床判斷凝血彈性描記圖資料的時候應該謹慎一些。
（唐亮 譯 馬皓琳 李士通 校）

BACKGROUND: Bedside thromboelastography is increasingly used, but an assessment of the clinical interchangeability of the 2 major systems, TEG® (Hemoscope) and RoTEM® (Pentapharm), has not been performed.

METHODS: We measured blood samples from 46 cardiac surgical patients after induction of anesthesia with kaolin TEG® (kaoTEG), native TEG® (natTEG®), intrinsic RoTEM® (inTEM), and extrinsic RoTEM (exTEM). Each measurement consisted of reaction time (R), coagulation time (K), maximum amplitude (MA), and angle (α). Bland–Altman plots and mixed-model analysis were used. To assess repeatability, we made 7 replicated measurements in rapid succession in 2 volunteers.
RESULTS: One hundred sixty-six measurements were available for analysis. The R time of the kaoTEG® (345 ± 102 seconds, mean ± sd) was longer than that of the inTEM (179 ± 74 seconds, $P < 0.001$) and the exTEM (55 ± 28 seconds, $P < 0.001$). The K time of the kaoTEG® (78 ± 18s) was not different from that of the inTEM (75 ± 52 seconds, $P = 0.60$) but was longer than the K time of the exTEM (61 ± 24 seconds, $P < 0.003$). The MA of the kaoTEG® (71 ± 6.5 mm) was larger than the MA of the inTEM (67 ± 5.2 mm, $P < 0.02$) and almost similar to that of the exTEM (69 ± 6.3 mm). The α of the kaoTEG® (72° ± 4.1°) was not significantly different from that of both the inTEM (76° ± 7°) and the exTEM (79° ± 4.5°). The variability for MA and α was <10%. The repeatability of the R and K times was poor in both devices, whereas the repeatability of the MA and α was sufficient for clinical purposes.
CONCLUSIONS: The TEG® and RoTEM® measurements demonstrated a close correlation for the MA, but the α did not for the R and K variables. The kaoTEG® had the best agreement with the exTEM measurement. Therefore TEG® and RoTEM® measurements are not completely interchangeable, and the clinical interpretation of thromboelastograhic data should be used with caution.

以房室和生理學為基礎的異丙酚再迴圈藥代動力學模型的表現：用推注、持續和靶控輸注的資料比較

The Performance of Compartmental and Physiologically Based Recirculatory Pharmacokinetic Models for Propofol: A Comparison Using Bolus, Continuous, and Target-Controlled Infusion Data

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背景：隨著由藥代動力學（PK）所得出的藥物轉運和/或藥物諮詢演示的越來越廣泛應用，確認各種不同的劑量條件下能最好地描述異丙酚血漿濃度（Cp）的 PK 模型將會非常有用。我們應用來源於用不同輸注方案的研究的濃度-時間資料，驗證了 3 個房室模型以及 1 個以生理為基礎的異丙酚再迴圈的 PK 模型預測異丙酚 Cp 的時間過程的精確度。

方法：異丙酚的三個房室 PK 模型（稱為 Marsh、Schnider、Schüttler 模型）以及一個以生理學為基礎的再迴圈模型（稱為 Upton 模型），用來類比異丙酚 Cp 的時間過程。為了驗證這些模型的精確性，我們應用已經發表的測定的血漿濃度資料，這些資料來源於人為輸注（推注和短時間的輸注）以及電腦控制（靶控輸注[TCI]或長時間的輸注）異丙酚給藥模式。異丙酚 Cp 的測定值與預測值得比值（M/P）組成了資料集。每一種模型的偏倚和不精確性分別用中位數預測錯誤（MDPE）和中位數絕對預測錯誤（MDAPE）評價。

結果：4 個 PK 模型中，推注和短時間輸注過程中的 3 個房室模型的 M/P 異丙酚 Cp 均表現出偏倚。在長時間輸注的過程中，高濃度時 Marsh 和 Schüttler 模型的 M/P 異丙酚 Cp 較其他兩個模型差。TCI 過程中所有模型的 M/P 異丙酚 Cp 的偏倚較小。在推注組，推注 1min 後，所有 3 個房室模型的值在全部的 5min 內均被過高地估計了。然而，Schnider 模型中，4 分鐘後，這些最初的錯誤解決了。在第 1min 內，Upton 模型並不能準確地預測異丙酚 Cp（較大的高估）。在推注和短時間注射的過程中，與其他 3 種模型相比，Marsh 模型顯示出較差的 MDPE 和 MDAPE。在短時間輸注的過程中，Schnider 和 Schüttler 模型的 MDAPE 比 Upton 和 Marsh 模型更好。所有的模型在 TCI 過程中均能表現出相似的 MDPE 和 MDAPE。在長時間輸注過程中，Marsh 和 Schüttler 模型均低估了較高的血漿濃度。

結論：當與不同的輸注模式時的表現相聯繫時，Schnider 模式，雖然仍不完美，仍是被推薦用於 TCI 和藥物諮詢演示的模式。

（黃麗娜 譯 馬皓琳 李士通 校）

BACKGROUND: With the growing use of pharmacokinetic (PK)-driven drug delivery and/or drug advisory displays, identifying the PK model that best characterizes propofol plasma concentration (Cp) across a variety of dosing conditions would be useful. We tested the accuracy of 3 compartmental models and 1 physiologically based recirculatory PK model for propofol to predict the time course of propofol Cp using concentration-time data originated from studies that used different infusion schemes.

METHODS: Three compartmental PK models for propofol, called the "Marsh," the "Schnider," and the "Schüttler" models, and 1 physiologically based recirculatory model called the "Upton" model, were used to simulate the time course of propofol Cp. To test the accuracy of the models, we used published measured plasma concentration data that originated from studies of manual (bolus and short infusion) and computer-controlled (target-controlled infusion [TCI] and long infusion) propofol dosing schemes. Measured/predicted (M/P) propofol Cp plots were constructed for each dataset. Bias and inaccuracy of each model were assessed by median prediction error (MDPE) and median absolute prediction error (MDAPE), respectively.

RESULTS: The M/P propofol Cp in the 4 PK models revealed bias in all 3 compartmental models during the bolus and short infusion regimens. In the long infusion, a worse M/P propofol Cp at higher concentration was seen for the Marsh and the

Schüttler models than for the 2 other models. Less biased M/P propofol Cp was found for all models during TCI. In the bolus group, after 1 min, a clear overprediction was seen for all 3 compartmental models for the entire 5 min; however, this initial error resolved after 4 min in the Schnider model. The Upton model did not predict propofol Cp accurately (major overprediction) during the first minute. During the bolus and short infusion, the Marsh model demonstrated worse MDPE and MDAPE compared with the 3 other models. During short infusion, MDAPE for the Schnider and Schüttler models was better than the Upton and the Marsh models. All models showed similar MDPE and MDAPE during TCI simulations. During long infusion, the Marsh and the Schüttler models underestimated the higher plasma concentrations.
CONCLUSION: When combining the performance during various infusion regimens, it seems that the Schnider model, although still not perfect, is the recommended model to be used for TCI and advisory displays.

在大鼠穹窿周圍微量注入丙泊酚導致鎮靜並伴有大腦皮質乙醯膽鹼釋放減少

Microinjection of Propofol into the Perifornical Area Induces Sedation with Decreasing Cortical Acetylcholine Release in Rats

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背景：在中樞神經系統的許多神經遞質中，已有研究表明膽鹼能系統有助於丙泊酚的鎮靜/麻醉作用，因為已證明膽鹼酯酶抑制劑能逆轉丙泊酚引起的人類無意識水準。已有研究報導，腹腔內注射丙泊酚能引起鎮靜/麻醉作用，並且減少大鼠大腦皮質乙醯膽鹼（Ach）的釋放。然而，丙泊酚在膽鹼能通路中的作用靶點和相關通路仍然不清楚。我們研究了採用微量注入法將丙泊酚注入膽鹼能通路的核心和相關通路是否能導致鎮靜並減少大腦皮層 Ach 的釋放。
方法:37 只雄性 Wistar 鼠，體重 270-320g。在實驗開始前 5 天，有 23 只大鼠採用戊巴比妥(50 mg/kg)麻醉，每只大鼠都連接有腦電圖（EEG）、大腦皮層微透析管、一根腹膜內導管或一根微量注射導管連接到基底前腦（BF）、穹窿周圍區(Pef)或紋狀體。對能自由活動的大鼠的大腦採用微量滲析技術研究發現，在軀體感覺皮層有乙醯膽鹼的流出。一旦乙醯膽鹼基礎水準穩定，每 20 分鐘收集一次樣本，並採用高性能液體色譜法測定。在腹腔組，丙泊酚逐漸增量(10、30 和 100 mg/kg)注入腹腔。在顯微注射組，丙泊酚(40 ng /0.2 μL)注入基底前腦、穹窿周圍或紋狀體（控制組），並監測 2 小時內大腦皮層 Ach 流出和 EEG 的變化 。另外 14 只大鼠，在經腹腔內、穹窿周圍或紋狀體注入丙泊酚後行鎮靜/麻醉評分。微量滲析探針和顯微注射管的頭端位置均通過組織學檢查來驗證。
結果：腹腔內注射丙泊酚劑量依賴性地減少 Ach 的流出，並導致了輕度鎮靜到中度麻醉的狀態。在丙泊酚 100 mg/kg 時可以觀察到翻正反射的消失和相對 α-波的明顯增多。微量注射丙泊酚至前腦組在實驗開始 40-60 分鐘時，大腦皮層的 Ach 流出

量顯著降低至-40.2% ± 19.9%。然而， 2 小時內 BF 組和對照組 Ach 流出總量沒有區別。相反，在 Pef 顯微注射丙泊酚到 Pef 組，在實驗開始 0-20 分鐘內 Ach 的流出立即減少，在 100-120 分鐘時最大降到-59.3 ± 20.4%。在 Pef 微量注入組 Ach 總流出量要比對照組明顯減少。相同劑量的丙泊酚注入穹窿周圍僅引起輕到中度的鎮靜。在 BF 或 Pef 和對照組之間相對 EEG 波段沒有明顯變化。

結論：穹窿周圍核心至少部分與丙泊酚引起大鼠鎮靜有關。

（楊秀娟 譯 馬皓琳 李士通 校）

BACKGROUND: Among many neurotransmitter systems in the central nervous system, the cholinergic system has been shown to contribute to propofol's sedative/anesthetic effects, because it has been shown that cholinesterase inhibitor reverses the level of propofol-induced unconsciousness in humans. It has been reported that intraperitoneal injection of propofol induced sedative/anesthetic actions and decreased the release of acetylcholine (Ach) from the rat cortex. However, the sites of action of propofol in the cholinergic pathway and its related pathways remain unresolved. We studied whether microinjection of propofol into the nuclei in the cholinergic pathway and its related pathways may induce sedation and decrease Ach from the cortex.

METHODS: Thirty-seven male Wistar rats weighing 270 to 320 g were used. Almost 5 days before the experiments, 23 rats anesthetized with pentobarbital (50 mg/kg) were outfitted with an electroencephalogram (EEG) socket, a microdialysis cannula in the cortex, and an intraperitoneal tube or a microinjection tube into the basal forebrain (BF), the perifornical area (Pef), or the striatum. The Ach effluxes in the somatosensory cortex were detected using in vivo intracerebral microdialysis in freely moving rats. Once basal levels of Ach were stabilized, samples were collected every 20 minutes and measured by high-performance liquid chromatography. In the intraperitoneal group, propofol was cumulatively administered (10, 30, and 100 mg/kg) into the peritoneal cavity. In the microinjection groups, propofol (40 ng in 0.2 μL) was administered into the BF, the Pef, or the striatum (control), and the cortical changes in Ach efflux and EEG were observed for 2 hours. In another 14 rats, the sedative/anesthetic score was obtained after intraperitoneal, Pef, or striatal injection of propofol. The placement of the tip of the microdialysis probe and the microinjection tube was confirmed by histological examination.

RESULTS: Intraperitoneal injection of propofol dose-dependently decreased the Ach efflux and induced light sedative to moderate anesthetic states. Loss of righting reflex was observed with significant increases in the relative α-power band at 100 mg/kg propofol. Microinjection of propofol into the BF significantly decreased the cortical Ach efflux to −40.2% ± 19.9% at 40 to 60 minutes. However, there was no difference in the total Ach efflux for 2 hours between BF and control groups. In contrast, microinjection of propofol into the Pef immediately decreased the Ach efflux at 0 to 20 min and maximally to −59.3 ± 20.4 at 100 to 120 minutes. The total Ach efflux in the Pef microinjection group was significantly less than that in the control group. The same dose of propofol injected into the Pef induced light to deep sedation. There was no significant change in the relative EEG power band between BF or Pef and control groups.

CONCLUSION: The nuclei in the Pef are, at least in part, responsible for the sedative action of propofol in rats.

經皮二氧化碳監測可以在長時間腹腔鏡手術中準確預測動脈血二氧化碳分壓

Transcutaneous Carbon Dioxide Monitoring Accurately Predicts Arterial Carbon Dioxide Partial Pressure in Patients Undergoing Prolonged Laparoscopic Surgery

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背景：在腹腔鏡手術中呼氣末二氧化碳($Petco_2$)和動脈血二氧化碳分壓($Paco_2$)之間可能存在著明顯的差異。經皮二氧化碳監測($Ptcco_2$)可以持續無創地預測 $Paco_2$ 。在此研究中我們評估了在長時間氣腹的腹腔鏡手術中用 $Ptcco_2$ 預測 $Paco_2$ 的準確性。
方法：選擇 16 例全麻下行腹腔鏡胃癌或直腸癌根治術的患者。在氣腹前後三個時間點測量他們的 $Paco_2$、$Petco_2$、和 $Ptcco_2$ 值。用 Bland-Altman 法評估測定值之間的一致性。
結果：得到 48 個樣本。$Paco_2$- $Ptcco_2$ 平均差值為−0.9 ± 6.4 mm Hg (平均值± 2 倍標準差)。$Paco_2$ − $Petco_2$ 平均差值為 7.5 ± 7.0 mm Hg(平均值± 2 倍標準差)。88%的樣本 $Paco_2$ − $Ptcco_2$ 的差值在±5 mm Hg 之內。而 17%的樣本 $Paco_2$ − $Petco_2$ 的差值在 ±5 mm Hg 之內($P < 0.05$)。
結論：在長時間的氣腹腹腔鏡手術中，經皮二氧化碳 (Ptcco2)比呼氣末二氧化碳 (Petco2)能更準確地預測患者的動脈血二氧化碳分壓(Paco2)。
（滕凌雅 譯 馬皓琳 李士通 校）

BACKGROUND: There may be large differences between measurements of end-tidal carbon dioxide partial pressure ($Petco_2$) and arterial carbon dioxide partial pressure ($Paco_2$) during laparoscopic surgeries. Transcutaneous carbon dioxide ($Ptcco_2$) monitoring can be used to noninvasively and continuously estimate $Paco_2$. In the present study we evaluated the accuracy of $Ptcco_2$ monitoring in predicting the $Paco_2$ during laparoscopic surgeries with prolonged pneumoperitoneum.
METHODS: Sixteen patients who underwent laparoscopic radical gastrectomy or radical proctectomy under general anesthesia were included in the study. Their $Paco_2$, $Petco_2$, and $Ptcco_2$ values were measured at 3 time points before and after pneumoperitoneum. Agreement among measures was assessed by the Bland–Altman method.
RESULTS: Forty-eight sample sets were obtained. The average $Paco_2$- $Ptcco_2$ difference was −0.9 ± 6.4 mm Hg (mean ± 2 SD). The average $Paco_2$ − $Petco_2$ difference was 7.5 ± 7.0 mm Hg (mean ± 2 SD). $Paco_2$ − $Ptcco_2$ was less than or equal to ±5 mm Hg for 88% of the samples. $Paco_2$ − $Petco_2$ was less than or equal to ±5 mm Hg for 17% of the samples ($P < 0.05$).
CONCLUSIONS: While undergoing long-term pneumoperitoneum laparoscopic surgery, $Ptcco_2$ monitoring is more accurate than is $PETCO_2$ monitoring in predicting the patients' $Paco_2$.

頭低腳高位以及呼氣末正壓通氣對頸內靜脈橫斷面積的影響

The Impact of Trendelenburg Position and Positive End-Expiratory Pressure on the Internal Jugular Cross-Sectional Area

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背景：右頸內靜脈橫斷面積（CSA）的增加可以便於置管並且減少併發症。頭低腳高及呼氣末正壓通氣（PEEP）等措施可以增加右頸內靜脈的 CSA。我們測定不同的措施引起的 CSA 變化。
方法：通過二維超聲測得 50 例接受心胸手術麻醉成年患者的右頸內靜脈的 CSA。首先，在仰臥位沒有接受正壓通氣時測得 CSA（對照組，S0）並且與 5 種不同隨機順序的方法時的 CSA 比較：（1）PEEP 通氣 5 cm H_2O (S5)、（2）PEEP 10 cm H_2O(S10)、（3）頭低腳高斜位 20°並且 PEEP 0 cm H_2O（T0）、（4）頭低腳高斜位 20°並且 PEEP 5 cm H_2O（T5）和（5）頭低腳高斜位 20°並且 PEEP 10 cm H_2O（T10）。
結果：通過與對照組（S0）的比較，所有方法均能增加右頸內靜脈的 CSA（所有 $p<0.05$）。S5 組增加 CSA 平均為 15.9%，S10 為 22.3%，T0 為 39.4%，T5 為 38.7%，T10 為 49.7%。
結論：通過比較運用不同的呼氣末正壓通氣水準和/或頭低腳高斜位對右頸內靜脈切面面積的影響，頭低腳高斜位的方法最為有效。
（龔寅 譯，馬皓琳 李士通 校）

BACKGROUND: Increasing the cross-sectional area (CSA) of the right internal jugular vein facilitates cannulation and decreases complications. Maneuvers such as the Trendelenburg tilt position and ventilation with a positive end-expiratory pressure (PEEP) may increase the CSA of the right internal jugular vein. We determined the changes in the CSA in response to different maneuvers.
METHODS: The CSA (cm^2) of the right internal jugular vein was assessed in 50 anesthetized adult cardiothoracic surgery patients using 2-dimensional ultrasound. First, the CSA was measured in response to supine position with no PEEP (control condition, S0) and compared with 5 different randomly ordered maneuvers: (1) PEEP ventilation with 5 cm H_2O (S5), (2) PEEP with 10 cm H_2O (S10), (3) a 20° Trendelenburg tilt position with a PEEP of 0 cm H_2O (T0), (4) a 20° Trendelenburg tilt position combined with a PEEP of 5 cm H_2O (T5), and (5) a 20° Trendelenburg tilt position combined with a PEEP of 10 cm H_2O (T10).
RESULTS: All maneuvers increased the CSA of the right internal jugular vein with respect to the control condition S0 (all $P < 0.05$). S5 increased the CSA on average by 15.9%, S10 by 22.3%, T0 by 39.4%, T5 by 38.7%, and T10 by 49.7%.

CONCLUSION: In a comparison of the effectiveness of applying different PEEP levels and/or the Trendelenburg tilt position on the CSA of the right internal jugular vein, the Trendelenburg tilt position was most effective.

危重患者發生急性呼吸窘迫綜合征的術中危險因數

Intraoperative Risk Factors for Acute Respiratory Distress Syndrome in Critically Ill Patients

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背景：重症監護室（ICU）的患者發生急性呼吸窘迫綜合征（ARDS）的相關危險因數包括液體正平衡、高潮氣量、高氣道壓和血製品的輸注。然而，檢查術中因素（如液體復蘇、機械通氣策略和血製品的輸注）對術後 ARDS 發生發展的影響的研究尚很不足。
方法：對於術後出現缺氧呼吸衰竭而入住 ICU 需要機械通氣的患者，我們應用既定的臨床和放射學標準對其術後 7 天 ARDS 的發生發展情況進行評估。從麻醉電子病歷和醫療記錄獲取 ARDS 危險因素的相關資料。在對臨床重要的協同變數進行調整後，運用對數回歸分析檢查術中液體復蘇、單位理想體重的潮氣量和血製品輸注量與術後發生 ARDS 之間的獨立相關關係。
結果：89 例術後呼吸衰竭的患者中，25 例發展為 ARDS。與以<10 mL/kg/h 輸液速度相比，術中以 >20 mL/kg/h 的速度輸液的患者發展為 ARDS 的風險是前者的 3.8 倍(P = 0.04)，以 10-20mL/kg/h 的速度輸注的患者則為其 2.4 倍 (P = 0.14)。本研究中，單位理想體重的潮氣量和血製品輸注量與 ARDS 的發生無關。
結論：本佇列研究為揭示術中液體復蘇與術後發生 ARDS 之間的關係提供了證據，但仍需要大型的前瞻性實驗來確認這些發現。
（徐妍君 譯　馬皓琳 李士通 校）

BACKGROUND: Risk factors for the development of acute respiratory distress syndrome (ARDS) in the intensive care unit (ICU) include positive fluid balance, high tidal volumes (TVs), high airway pressures, and transfusion of blood products. However, research examining intraoperative factors such as fluid resuscitation, mechanical ventilation strategies, and blood administration on the postoperative development of ARDS is lacking.
METHODS: We assessed patients admitted to the ICU with postoperative hypoxemic respiratory failure requiring mechanical ventilation for the development of ARDS in the first 7 postoperative days using established clinical and radiological criteria. Data on risk factors for ARDS were obtained from the electronic anesthetic and medical records. Logistic regression was used to examine the independent association between fluid resuscitation, TV per ideal body weight, and number of blood products transfused during

surgery and the postoperative development of ARDS, adjusting for important clinical covariates.
RESULTS: Of the 89 patients with postoperative respiratory failure, 25 developed ARDS. Compared with those who received <10 mL/kg/h fluid resuscitation in the operating room, patients receiving >20 mL/kg/h fluid resuscitation had a 3.8 times higher adjusted odds of developing ARDS (P = 0.04), and those receiving 10 to 20 mL/kg/h had a 2.4 times higher adjusted odds of developing ARDS (P = 0.14). TV per ideal body weight and the number of blood units transfused were not associated with ARDS development in this study.
CONCLUSIONS: This cohort study provides evidence to suggest a relationship between intraoperative fluid resuscitation and the development of ARDS. Larger prospective trials are required to confirm these findings.

剖宮產後蛛網膜下腔嗎啡與超聲引導下腹橫肌平面阻滯的鎮痛效能比較：一個隨機對照試驗

The Analgesic Efficacy of Subarachnoid Morphine in Comparison with Ultrasound-Guided Transversus Abdominis Plane Block After Cesarean Delivery: A Randomized Controlled Trial

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背景：超聲引導下腹橫肌平面阻滯是剖宮產術後緩解疼痛的有效方法。椎管內嗎啡是當前剖宮產後疼痛治療的“金標準”。本研究中我們驗證這樣一個假設，即在擇期剖宮產病人中蛛網膜下腔嗎啡鎮痛比腹橫肌平面阻滯鎮痛時間更長且效果更好。
方法：在這個前瞻、雙盲研究中，57 個病人隨機接受蛛網膜下腔嗎啡鎮痛（SAM 組；n=28）或腹橫肌平面阻滯鎮痛（TAP 組；n=29）。SAM 組病人接受布比卡因脊麻聯合給予 0.2mg 嗎啡而 TAP 組病人則給予鹽水。手術結束時，SAM 組給予鹽水 20ml 而 TAP 組給予 0.375%的布比卡因加 5 μg/mL 的腎上腺素兩側各 20ml 完成雙側腹橫肌平面阻滯。術後首個 24 小時鎮痛包括按計劃直腸給予雙氯芬酸和靜脈給予對乙醯氨基酚，鎮痛不全則靜脈給予曲馬多治療。第二個 24 小時，按計劃直腸給予雙氯芬酸，如病人要求則給予口服對乙醯氨基酚和靜脈注射曲馬多治療。在麻醉後監護室中（時間 0 小時）及 2、4、6、12、24、36 和 48 小時對病人進行術後評估。主要結果測量是首次要求鎮痛藥的時間。
結果：SAM 組首次要求鎮痛藥的時間中位數（範圍）比 TAP 組晚[8 (2–36) 小時對 4 (0.5 to 29) 小時 (P = 0.005)]。SAM 組 0-12 小時內接受曲馬多注射的次數中位數（範圍）是 0（0-1）比 TAP 組的 0（0-2）少（p=0.03）。SAM 組術後首個 4 小時內平靜和運動時的內臟痛評分比 TAP 組低，但在其他時間點沒有差異。SAM 組中

重度噁心的發生率比 TAP 組高[13/28 (46%) 對 5/29 (17%) (P = 0.02)]。SAM 組發生瘙癢症要求治療的病人數比 TAP 組多[(11/28 (39%) 對 0/29 (0%) (P < 0.001)]。
結論：作為多模式鎮痛方法的一部分，剖宮產術後蛛網膜下腔嗎啡比超聲引導下腹橫肌平面阻滯的鎮痛效果更好，而代價則是增加的副反應。
（周潔 譯 馬皓琳 李士通 校）

BACKGROUND: Ultrasound-guided transversus abdominis plane block is an effective method of providing pain relief after cesarean delivery. Neuraxial morphine is currently the “gold standard” treatment for pain after cesarean delivery. In this study we tested the hypothesis that subarachnoid morphine would provide more prolonged and superior analgesia than would transversus abdominis plane block in patients undergoing elective cesarean delivery.
METHODS: In this prospective, double-blind study, 57 patients were randomly assigned to receive either subarachnoid morphine (group SAM; n = 28) or transversus abdominis plane block (group TAP; n = 29). Patients received bupivacaine spinal anesthesia combined with morphine 0.2 mg in group SAM and received saline in group TAP. At the end of surgery, bilateral transversus abdominis plane block was performed using saline in group SAM or using bupivacaine 0.375% plus epinephrine 5 μg/mL in group TAP with 20 mL on each side. Postoperative analgesia for the first 24 hours consisted of scheduled rectal diclofenac and IV paracetamol; breakthrough pain was treated with IV tramadol. For the next 24 hours, scheduled rectal diclofenac was given; oral paracetamol and IV tramadol were administered upon patient request. Patients were assessed postoperatively in the postanesthesia care unit (time 0 hours) and at 2, 4, 6, 12, 24, 36, and 48 hours. The primary outcome measure was the time to first analgesic request.
RESULTS: Median (range) time to first analgesic request was longer in group SAM than in group TAP [8 (2–36) hours versus 4 (0.5 to 29) hours (P = 0.005)]. Median (range) number of tramadol doses received between 0 and 12 hours was 0 (0–1) in group SAM versus 0 (0–2) in group TAP (P = 0.03). Postoperative visceral pain scores at rest and on movement during first the 4 hours were lower in group SAM than in group TAP, but were not different at any other time points. The incidence of moderate to severe nausea was higher in group SAM than in group TAP [13/28 (46%) versus 5/29 (17%) (P = 0.02)]. More patients developed pruritus requiring treatment in group SAM than in group TAP [(11/28 (39%) versus none (0%) (P < 0.001)].
CONCLUSION: As part of a multimodal analgesic regimen, subarachnoid morphine provided superior analgesia when compared with ultrasound-guided transversus abdominis plane block after cesarean delivery, yet at the cost of increased side effects.

在短暫全腦缺血小鼠模型中，異氟醚預處理通過減少泛素結合蛋白聚合體而產生神經保護作用

Isoflurane Preconditioning Induces Neuroprotection by Attenuating Ubiquitin-Conjugated Protein Aggregation in a Mouse Model of Transient Global Cerebral Ischemia

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背景：本研究中，我們試圖闡述抑制泛素結合蛋白聚合體在異氟醚預處理後短暫全腦缺血再灌注損傷小鼠模型神經保護效應形成中的作用。
方法：C57BL/6 小鼠隨機分成 3 組：異氟醚預處理組（IsoPC）、對照組（Con）和假手術組（每組 24 只）。異氟醚預處理組和假手術組小鼠置於一室內並對其進行異氟醚預處理 5 天（1.2% 異氟醚, 98% 氧氣, 1 小時/天）。對照組小鼠置於相同室內，但是僅使用氧氣預處理 5 天（98% O_2, 2% N_2, 1 小時/天）。在最後一次預處理 24 小時後，IsoPC 組和 Con 組小鼠雙側頸總動脈閉塞 20 分鐘建造全腦缺血模型。灌注後，通過神經學評估、免疫組織化學和免疫印跡法（24 小時和 72 小時時）分別對總運動評分、海馬 CA1 區活性神經元數目和結合泛素或游離泛素的表達水準進行評估。
結果：IsoPC 組比 Con 組總運動評分好($P < 0.05$)。形態學顯示：IsoPC 組比 Con 組有更好的神經元結構。與 Con 組對比，通過異氟醚預處理明顯增加了 CA1 區的活性神經元數目($P < 0.05$)。在異氟醚預處理後，CA1 區的 TUNEL 陽性神經元數目明顯減少。IsoPC 組 CA1 區染色的結合泛素密度明顯比 Con 組低($P < 0.05$)，並且 IsoPC 組結合泛素的表達也低於 Con 組($P < 0.05$)。
結論：在短暫全腦缺血再灌注損傷小鼠模型中，異氟醚預處理產生大腦缺血耐受，抑制結合泛素聚合體可能在此過程中起到必不可少的作用。
（王海濤 譯；馬皓琳 李士通 校）

BACKGROUND: In this study, we sought to clarify the role of inhibiting ubiquitin-conjugated protein aggregation in the formation of a neuroprotective effect after isoflurane preconditioning using a transient global cerebral ischemia-reperfusion injury mouse model.
METHODS: C57BL/6 mice were randomly assigned to 3 groups (isoflurane preconditioning [IsoPC] group, control [Con] group, and sham group, n = 24 in each group). Mice in the IsoPC group and sham group were placed in a chamber and pretreated with isoflurane (1.2% isoflurane, 98% O_2, 1 hour/day) for 5 days. Mice in the Con group were placed in the same chamber but pretreated with oxygen only (98% O_2, 2% N_2, 1 hour/day) for 5 days. Twenty-four hours after the last preconditioning day, bilateral common carotid artery occlusion was performed as a model of global cerebral ischemia for 20 minutes in the IsoPC group and Con group. The total motor scores, number of viable neurons in the CA1 region of the hippocampus, and expression levels of conjugated ubiquitin or free ubiquitin were assessed by neurological assessment, immunohistochemistry, and Western blotting (at 24 and 72 hours) after reperfusion, respectively.
RESULTS: The total motor scores in the IsoPC group were better than the Con group ($P < 0.05$). Morphological observations showed that the IsoPC group had better neuron structure than in the Con group. The numbers of viable neurons in the CA1 region were significantly increased by isoflurane preconditioning compared with those in the Con group ($P < 0.05$). The numbers of TUNEL-positive neurons in the CA1 region were

significantly decreased after isoflurane preconditioning. The density of conjugated ubiquitin staining in the CA1 region of the IsoPC group was significantly lower than in the Con group ($P < 0.05$) and the expression of conjugated ubiquitin in the IsoPC group was lower than in the Con group ($P < 0.05$).
CONCLUSION: Inhibition of ubiquitin-conjugated protein aggregation may have an essential role in inducing cerebral ischemic tolerance by isoflurane preconditioning in a transient global cerebral ischemia-reperfusion injury mouse model.

下頜神經酒精阻滯治療三叉神經痛的長期影響

The Long-Term Outcome of Mandibular Nerve Block with Alcohol for the Treatment of Trigeminal Neuralgia

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本前瞻性研究中，98 位病人接受 160 次下頜神經(V3)酒精阻滯治療三叉神經痛。根據 Kaplan-Meier 分析，治療後 1、2、3 和 7 年的無痛概率分別是 90.4%、69%、53.5% 和 33%。重複或單次 V3 酒精阻滯後的無痛持續時間和併發症無明顯差別。我們推斷，單次和重複 V3 酒精阻滯治療三叉神經痛能夠提供長時間的疼痛緩解。(江繼宏 譯 馬皓琳 李士通 校)

Ninety-eight patients received 160 mandibular nerve (V3) blocks with alcohol for the treatment of trigeminal neuralgia in this prospective study. According to the Kaplan-Meier analysis, the probabilities of remaining pain free for 1, 2, 3, and 7 years after the procedures were 90.4%, 69%, 53.5%, and 33%, respectively. There was no significant difference in the probability of pain-free duration and complications between patients with repeat versus single V3 block with alcohol. We conclude that single and repeat V3 alcohol block for trigeminal neuralgia can provide long-lasting pain relief.

40Mg 和 60Mg 高比重 2%丙胺卡因與 60Mg 等比重 2%丙胺卡因比較用於門診手術中鞘內麻醉的一個前瞻、雙盲、隨機、臨床試驗

A Prospective, Double-Blinded, Randomized, Clinical Trial Comparing the Efficacy of 40 Mg and 60 Mg Hyperbaric 2% Prilocaine Versus 60 Mg Plain 2% Prilocaine for Intrathecal Anesthesia in Ambulatory Surgery

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背景：在本前瞻、雙盲、隨機試驗中，我們將 60mg 和 40mg 的 2%高比重丙胺卡因與 60mg 的 2%等比重丙胺卡因比較用於擇期短時（<60 分鐘）手術的門診患者中脊麻感覺阻滯起效時間。
方法：入選 90 例患者，隨機分別接受 3 種處理方法中的一種。盲法記錄感覺和運動阻滯起效時間、達到最高感覺阻滯平面的時間、首次排尿的時間、達到 Bromage 評分為 0 的時間以及副作用。不知道分組的觀察者在脊麻後 24 小時好 7 天詢問患者有無一過性神經症狀。
結果：感覺阻滯平面達到 T10 的平均時間在 3 組之間相近。然而，20%的接受等比重的患者未達到 T10 水準。2 個高比重劑量（60mg 和 40mg）均比等比重丙胺卡因顯示出顯著較快地運動阻滯起效（分別為 P = 0.0091、P = 0.0097）、達到最高感覺阻滯平面（P = 0.0297、P = 0.0183）、運動阻滯減退（P = 0.0004、P < 0.0001）及首次排尿（P = 0.0013、P = 0.0002）。在研究中未觀察到較嚴重的不良反應或一過性神經症狀。
結論：用 60mg 或 40mg 的 2%高比重丙胺卡因脊麻與 60mg 的等比重丙胺卡因在感覺阻滯達到 T10 的起效方面相當。高比重溶液顯示較快的運動阻滯起效和較短的手術阻滯持續時間，提示其用於門診手術麻醉的優越性。
（馬皓琳 譯 李士通 校）

BACKGROUND: In this prospective, double-blind, randomized trial we compared 60 mg and 40 mg of 2% hyperbaric prilocaine with 60 mg of 2% plain prilocaine for spinal anesthesia in terms of sensory block onset in outpatients undergoing elective short-duration (<60 minutes) surgery under spinal anesthesia.
METHODS: Ninety patients were enrolled and randomly allocated to receive 1 of the 3 treatments. Times to sensory and motor block onsets, time to the maximum sensory block level, readiness for surgery, time to first urinary voiding, time to Bromage's score 0, and side effects were registered blindly. A blinded observer also questioned patients about transient neurological symptoms 24 hours and 7 days after spinal anesthesia.
RESULTS: Mean times to achieve a T10 level of sensory block were comparable in the 3 groups. However, 20% of patients receiving plain prilocaine did not achieve a T10 level. The 2 hyperbaric dosages (60 mg and 40 mg) showed significantly faster times to motor block onset (P = 0.0091, P = 0.0097), to the maximum sensory block level (P = 0.0297, P = 0.0183), to motor block offset (P = 0.0004, P < 0.0001), and to first urinary voiding (P = 0.0013, P = 0.0002, respectively) than did plain prilocaine. No major adverse reactions or transient neurological symptoms were observed in the study.
CONCLUSIONS: Spinal anesthesia with 60 mg or 40 mg of 2% hyperbaric prilocaine is comparable to 60 mg of 2% plain prilocaine in terms of onset of sensory block at T10. The hyperbaric solution showed faster times to motor block onset and shorter duration of surgical block, suggesting its superiority for the ambulatory setting.

術前他汀類藥物治療與心臟外科術後急性腎損傷發生率的下降無關

Preoperative statin therapy is not associated with a reduced incidence of postoperative acute kidney injury after cardiac surgery.

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背景：此項試驗旨在研究接受體外迴圈的心外科手術患者術前他汀類藥物治療與術後急性腎損傷（AKI）發生率之間的關係。
方法：本試驗回顧研究了 2002 年 1 月至 2006 年 12 月間 10648 名陸續接受體外迴圈下冠狀動脈旁路手術和/或心臟瓣膜手術的患者。根據患者術前他汀類藥物的治療方案將其分成 2 組。本試驗的主要結果為基於 RIFLE 標準（危險、損傷、衰竭、腎功能喪失及終末期腎病）的患者術後急性腎損傷的發生率。而術後血液透析的需求量及住院死亡率為該試驗的次要結果。運用多元 Logistic 回歸模型對主要及次要結果進行分析。為了控制他汀類藥物治療所產生的相關選擇偏倚，一項傾向性評分被用於行貪婪配對。
結果：術後急性腎損傷的發生率為 12.1%（n=1286）。相比術前接受他汀類藥物治療患者 13.31%的急性腎損傷發生率（6152 名患者中共發生 819 例），術前未服用他汀類藥物的患者其急性腎損傷的發生率為 10.41%（4487 名患者中共發生 467 例）（P＜0.001）。術後血液透析的發生率為 1.71%（n=182）。在接受他汀類藥物治療的患者中，其術後透析的需求量為 1.75%（6157 名患者中共發生 108 例），而非他汀類藥物治療的患者其需求量為 1.65%（4491 名患者中共發生 74 例）（P=0.68）。術後 1.71%的患者在住院時發生死亡（n=182）。其中，接受他汀類藥物治療的患者其死亡率為 1.71%（6157 名患者中共發生 105 例），與非他汀類藥物治療患者 1.71%的死亡率沒有差別（4491 名患者中共發生 77 例）（P=0.97）。在多元 Logistic 回歸分析中，術前他汀類藥物治療與術後急性腎損傷（相對危險度[OR]為 0.97，95%置信區間[CI]為 0.84-1.12；P = 0.68）、術後血液透析（OR 為 0.80，95%CI 為 0.55-1.18；P = 0.23）及住院死亡率（OR 為 0.803，95%CI 為 0.56-1.16；P = 0.24）無關。在 2646 對傾向性配對中，他汀類藥物治療組術後急性腎損傷的發生率為 12.0%，而非他汀類藥物治療組為 12.8%（P=0.38）。他汀類藥物治療組術後透析的發生率為 1.63%，而非他汀類藥物治療組為 2.08%（P=0.22）。在同一傾向性配對中，他汀類藥物治療組其住院死亡率為 1.63%，而非他汀類藥物治療組為 2.1%（P=0.19）。
結論：上述結果表明，先前關於術前接受他汀類藥物治療可降低心臟手術患者圍手術期死亡率的報導可能並不是通過減少其術後急性腎損傷的發生而介導的。
（范羽譯 薛張綱校）

BACKGROUND: Our objective was to examine the association between preoperative statin therapy and the prevalence of postoperative acute kidney injury (AKI) in patients undergoing cardiac surgery with the use of cardiopulmonary bypass.
METHODS: We performed a retrospective investigation of 10,648 consecutive patients undergoing coronary artery bypass grafting using cardiopulmonary bypass and/or valve surgery between January 2002 and December 2006. Patients were divided into 2 groups depending on preoperative therapy with statin drugs. The primary outcome was postoperative AKI based on the RIFLE (Risk, Injury, Failure, Loss, End-stage) criteria. Secondary outcomes included requirement for postoperative dialysis and hospital mortality. Multivariable logistic regression models were developed for the primary and secondary outcomes. To control for selection bias related to statin therapy, a propensity score was developed using a greedy matching technique.

RESULTS: The incidence of AKI was 12.1% (n = 1286). AKI occurred in 13.31% of patients receiving preoperative statins (819 of 6152 patients) versus 10.41% in the no statin group (467 of 4487 patients) (P < 0.001). The incidence of postoperative dialysis was 1.71% (n = 182). Postoperative dialysis was needed in 1.75% of patients in the statin group (108 of 6157 patients) compared with 1.65% of patients (74 of 4491 patients) in the no statin group (P = 0.68). Hospital mortality after surgery occurred in 1.71% (n = 182) of patients. The incidence of mortality for patients in the statin group was 1.71% (105 of 6157 patients) and this was not different from mortality in the no statin group of 1.71% (77 of 4491 patients) (P = 0.97). In multivariate logistic regression analysis, statin therapy was not associated with AKI (odds ratio [OR] 0.97, 95% confidence interval [CI] 0.84-1.12; P = 0.68), postoperative dialysis (OR 0.80, 95% CI 0.55-118; P = 0.23), or hospital mortality (OR 0.803, 95% CI 0.56-1.16; P = 0.24). In 2646 propensity-matched pairs, the incidence of AKI was 12.0% in the statin group versus 12.8% in the no statin group (P = 0.38). The statin group had a 1.63% incidence of postoperative dialysis versus 2.08% in the no statin group (P = 0.22). In the same propensity-matched population, hospital mortality occurred in 1.63% of patients in the statin group compared with 2.1% in the no statin group (P = 0.19).
CONCLUSION: These results suggest that previously reported reductions in perioperative mortality for patients taking preoperative statins and undergoing cardiac surgery is likely not mediated through a reduction in postoperative AKI.

動脈交叉鉗夾和再灌注在豬體中由於全身和局部血流重分配而導致微血管的氧合水準下降。

Aortic cross-clamping and reperfusion in pigs reduces microvascular oxygenation by altered systemic and regional blood flow distribution.

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背景：本研究驗證了這樣一種假設：大動脈交叉鉗夾和再灌注由於改變了正常的血流動力學和氧合作用，會引起腸道與腎臟微循環氧合與灌注的重分配變化。
方法：15頭麻醉後的豬被隨機分為兩組：大動脈交叉鉗夾(ACC)組有10頭，進行腸系膜上動脈以上的動脈交叉鉗夾45分鐘；另一對照組有5頭，與ACC組進行時間上同步的但不涉及腸系膜上動脈操作的手術。在再灌注後的4小時內，監測整個迴圈系 統的、腸道的和腎臟的血流動力學以及氧合情況。使用Pd-卟啉磷光法測量腸道漿膜和粘膜面以及腎皮質的微血管氧分壓。使用空氣張力測定法測量腸腔二氧化碳分壓，正交極化光譜顯像法測定漿膜微血管的血流。
結果：臟器的血流以及腎臟和腸道系統的微循環氧分壓值在ACC期顯著下降，而腸道的氧釋放和二氧化碳分壓上升。腸道在ACC後的再灌注期發生了持續性的充血反應，但是在腎臟則未觀察到此現象。儘管有持續性的高氧供，漿膜微血管的氧分壓值的基線水準與4小時的再灌注期相比較，結果為（中位數[間距]）49[41-

67]mmHg VS 37[27-41]mmHg;P<0.05。並且灌注微血管的絕對數值較ACC前有所下降，同時伴有腸道二氧化碳分壓的變化(17[10-19]mmHg VS 23[19-30]mmHg:P<0.05)。與此相反，腎臟的則表現為進行性的氧供下降伴有腎皮質氧合水準下降(70[52-93]mmHg VS 57[33-64]mmHg;P<0.05)。
結論：動脈交叉鉗夾後全身系統性和局部組織的血流灌注增加並不能保證滿足所有臟器的局部灌注需求和微循環氧合。
（黃劍譯 薛張綱校）

BACKGROUND: In this study, we tested the hypothesis that aortic cross-clamping (ACC) and reperfusion cause distributive alterations of oxygenation and perfusion in the microcirculation of the gut and kidneys despite normal systemic hemodynamics and oxygenation.
METHODS: Fifteen anesthetized pigs were randomized between an ACC group (n = 10), undergoing 45 minutes of aortic clamping above the superior mesenteric artery, and a time-matched sham surgery control group (n = 5). Systemic, intestinal, and renal hemodynamics and oxygenation variables were monitored during 4 hours of reperfusion. Microvascular oxygen partial pressure (microPo(2)) was measured in the intestinal serosa and mucosa and the renal cortex, using the Pd-porphyrin phosphorescence technique. Intestinal luminal Pco(2) was determined by air tonometry and the serosal microvascular flow by orthogonal polarization spectral imaging.
RESULTS: Organ blood flow and renal and intestinal microPo(2) decreased significantly during ACC, whereas the intestinal oxygen extraction and Pco(2) gap increased. The intestinal response to reperfusion after ACC was a sustained reactive hyperemia but no such effect was seen in the kidney. Despite a sustained high intestinal O(2) delivery, serosal microPo(2) (median [range], 49 mm Hg [41-67 mm Hg] versus 37 mm Hg [27-41 mm Hg]; P < 0.05 baseline versus 4 hours reperfusion) and the absolute number of perfused microvessels decreased along with an increased intestinal Pco(2) gap (17 mm Hg [10-19 mm Hg] versus 23 mm Hg [19-30 mm Hg]; P < 0.05). In contrast, the kidney showed a progressive O(2) delivery decrease accompanied by a decrease in renal cortex oxygenation (70 mm Hg [52-93 mm Hg] versus 57 mm Hg [33-64 mm Hg]; P < 0.05).
CONCLUSION: Increased systemic and regional blood flow and oxygen supply after ACC does not ensure adequate regional blood flow and microcirculatory oxygenation in all organs.

蘇醒室患者對疼痛的感知和反應的響應面預測模型：一項對應用異氟醚和芬太尼麻醉患者的評估

Response Surface Model Predictions of Emergence and Response to Pain in the Recovery Room: An Evaluation of Patients Emerging from an Isoflurane and Fentanyl Anesthetic

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介紹：七氟醚-瑞芬太尼相互作用模型預測了擇期手術患者的反應性並對疼痛刺激的反應進行了評估。預測模型的預評估同對應用七氟醚、瑞芬太尼和芬太尼麻醉的病人的觀察結果一致。此項研究表明了將七氟醚-瑞芬太尼相互作用模型的預測性應用於異氟醚-芬太尼麻醉的可行性。我們假設異氟醚和芬太尼預測模型同被觀察病人的反應一致，與先前七氟醚-瑞芬太尼/芬太尼麻醉預測模型觀察結論相同。
方法：25個擇期手術病人給予芬太尼-異氟醚麻醉。蘇醒室裏，對預測模型中無應答個體在其出現反應時進行記錄，而對傷害性刺激有反應的個體在其第一次需要鎮痛時進行記錄。預測模型同圖形及時間分析結論進行對比。結論與之前給予七氟醚-瑞芬太尼/芬太尼麻醉後的預測也進行對照。
結論：儘管患者都接受了麻醉，但預測模型顯示患者無應答的可能性很大（≥99%）。終止麻醉之後，預測模型蘇醒中反應良好的患者被定義為受觀察者中實際有反應的個體。預測模型中50%可能無應答的患者有半數在2分鐘之內蘇醒，70%在4分鐘內蘇醒。同樣，對傷害性刺激反應的預測性同蘇醒室裏需要芬太尼的病人數量也是一致的。異氟醚-芬太尼麻醉預測模型同七氟醚-瑞芬太尼/芬太尼麻醉預測模型結論是一致的。
討論：此結論證實了我們的研究設想；模型對無應答及對疼痛刺激無反應的預測適用於異氟醚-芬太尼，同觀察結果一致。這些結論同之前患者接受七氟醚-瑞芬太尼/芬太尼麻醉後進行觀察的對照預測模型都是一致的。
(毛慧譯，薛張綱校)

INTRODUCTION: Sevoflurane-remifentanil interaction models that predict responsiveness and response to painful stimuli have been evaluated in patients undergoing elective surgery. Preliminary evaluations of model predictions were found to be consistent with observations in patients anesthetized with sevoflurane, remifentanil, and fentanyl. This study explored the feasibility of adapting the predictions of sevoflurane-remifentanil interaction models to an isoflurane-fentanyl anesthetic. We hypothesized that model predictions adapted for isoflurane and fentanyl are consistent with observed patient responses and are similar to the predictions observed in our previous work with sevoflurane-remifentanil/fentanyl anesthetics.
METHODS: Twenty-five patients scheduled for elective surgery received a fentanyl-isoflurane anesthetic. Model predictions of unresponsiveness were recorded at emergence, and predictions of a response to noxious stimulus were recorded when patients first required analgesics in the recovery room. Model predictions were compared with observations with graphical and temporal analyses. Results were also compared with our previous predictions after the administration of a sevoflurane-remifentanil/fentanyl anesthetic.
RESULTS: Although patients were anesthetized, model predictions indicated a high likelihood that patients would be unresponsive (≥ 99%). After the termination of the anesthetic, model predictions of responsiveness well described the actual fraction of patients observed to be responsive during emergence. Half of the patients woke within 2 min of the 50% model-predicted probability of unresponsiveness; 70% woke within 4 min. Similarly, predictions of a response to a noxious stimulus were consistent with the number of patients who required fentanyl in the recovery room. Model predictions after

the administration of an isoflurane-fentanyl anesthetic were similar to model predictions after a sevoflurane-remifentanil/fentanyl anesthetic.
DISCUSSION: The results confirmed our study hypothesis; model predictions for unresponsiveness and no response to painful stimuli, adapted to isoflurane-fentanyl were consistent with observations. These results were similar to our previous study comparing model predictions and patient observations after a sevoflurane-remifentanil/fentanyl anesthetic.

等二氧化碳過度通氣法縮短異氟醚麻醉後的蘇醒室停留時間

Isocapnic Hyperpnoea Shortens Postanesthetic Care Unit Stay After Isoflurane Anesthesia

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背景 本實驗為前瞻性隨機對照的臨床試驗，旨在研究等二氧化碳過度通氣法（IH）對接受異氟醚麻醉（時長為 1.5～3h）的患者在手術室（OR）和蘇醒室（PACU）中蘇醒時間的影響。
方法 30 例 ASA Ⅰ～Ⅲ級，擬行擇期婦科手術的患者，在手術結束時隨機分成 IH 組或常規蘇醒組（對照組）。6 例麻醉時間＜90min 的患者在分析時予以剔除。麻醉給藥方案包括丙泊酚、芬太尼、嗎啡、羅庫溴銨和空氧混合的異氟醚。比較兩組蘇醒時間指標的差異時採用不成對的 t 核對總和方差分析。
結果 IH 組和對照組的麻醉持續時間分別為 140.8±32.7min 和 142±55.6 min（P = 0.99）。與對照組相比，IH 組的拔管時間更短（6.6±1.6 (SD) min vs. 13. 6±3.9 min；P＜0.01），睜眼時間更短（5.8±1.3 vs. 13.7±4.5 min；P＜0.01），能離開手術室的時間更短（8.0±1.7 vs. 17.4±6.1 min；P＜0.01），離開 PACU 的時間亦更短（74.0 ±16.5 vs. 94.5±14.7 minutes； P＜0.01）。有關兩組患者恢復的其他指標無顯著差異。
結論 IH 能加快時長 1.5～3h 的異氟醚麻醉的蘇醒，並縮短在 OR 和 PACU 的停留時間。
（吳少勇譯 薛張綱校）
BACKGROUND: We conducted a prospective controlled clinical trial of the effect of isocapnic hyperpnoea (IH) on the times-to-recovery milestones in the operating room (OR) and postanesthetic care unit (PACU) after 1.5 to 3 hours of isoflurane anesthesia.
METHODS: Thirty ASA grade I–III patients undergoing elective gynecological surgery were randomized at the end of surgery to either IH or the conventional recovery (control). Six patients with duration of anesthesia of <90 minutes were excluded from the analysis. The anesthesia protocol included propofol, fentanyl, morphine, rocuronium, and

isoflurane in air/O2. Unpaired t tests and analyses of variance were used to test for differences in times-to-recovery indicators between the two groups.
RESULTS: The durations of anesthesia in IH and control groups were 140.8 ± 32.7 and 142 ± 55.6 minutes, respectively (P = 0.99). The time to extubation was much shorter in the IH group than in the control group (6.6 ± 1.6 (SD) vs. 13. 6 ± 3.9 minutes, respectively; P < 0.01). The IH group also had shorter times to eye opening (5.8 ± 1.3 vs. 13.7 ± 4.5 minutes; P < 0.01), eligibility for leaving the OR (8.0 ± 1.7 vs. 17.4 ± 6.1 minutes; P < 0.01), and eligibility for PACU discharge (74.0 ± 16.5 vs. 94.5 ± 14.7 minutes; P < 0.01). There were no differences in other indicators of recovery.
CONCLUSION: IH accelerates recovery after 1.5 to 3 hours of isoflurane anesthesia and shortens OR and PACU stay.

患者特徵和麻醉技術是成功監測運動誘發電位的疊加而非協同因素

Patient Characteristics and Anesthetic Technique Are Additive but Not Synergistic Predictors of Successful Motor Evoked Potential Monitoring

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背景:脊髓監測與矯形手術後顯著降低的神經損害相關,同時在頸、胸、腰部手術中顯示出了其預測價值。下肢運動誘發電位對麻醉藥和生理改變及其敏感，且基線值難以獲得。麻醉醫生常常被要求改變麻醉深度來獲得電位資訊。雖然是顯而易見的，但是高齡、體重指數、糖尿病、和（或）高血壓、外科操作和麻醉技術和它的相關性未被描述。
方法:我們對 2001 年 8 月 1 日開始至 2005 年 12 月 31 日所有行脊髓手術並進行下肢運動誘發電位監測的患者進行回顧性研究。術前存在下肢癱瘓的患者排除在外。對糖尿病、高血壓、麻醉技術、年齡、性別、體重指數和外科操作進行單因素分析，觀察其分佈是否存在差異。運用 χ^2 核對總和兩樣本的 t 檢驗分析運動誘發電位狀態和可能的危險因素之間的聯繫。運用 Cochran-Armitage 檢驗以四分位數來分析體重指數和年齡的趨勢。每種麻醉技術下有糖尿病和高血壓的患者和兩者都無的患者的不同效應均有呈現。資料的雙變數分析應用 Breslow-Day 檢驗比值比的同質性來分析糖尿病、高血壓 、麻醉技術之間潛在的負性協同作用。運用逐步選擇的 logistic 回歸分析建立資訊模型。
結果:共回顧了 256 份病史。單因素分析顯示糖尿病、高血壓、麻醉技術、年齡及體重指數和不能獲得運動誘發電位顯著相關。雙變數分析顯示各因素之間沒有協同作用 。高血壓、糖尿病和麻醉技術是不能獲得運動誘發電位的獨立危險因素，他們的共同作用有疊加但非協同作用。

結論：糖尿病、高血壓和麻醉技術是不能獲得下肢運動誘發電位信號的重要患者危險因素。這些結果有助於麻醉醫生需要運動誘發電位監測時根據患者的合併症制定麻醉計畫。
（姚敏敏譯　薛張綱校）

BACKGROUND: Spinal cord monitoring is associated with a significantly lower rate of neurologic deficits after deformity surgery, and has been shown to have predictive value in cervical, thoracic, and lumbar surgery. Lower extremity motor evoked potentials (MEPs) are particularly sensitive to anesthetics and physiologic change, and can be difficult to obtain at baseline. The anesthesiologist is often required to modify the maintenance anesthetic to facilitate signal attainment. Although intuitive, the predictive significance of increasing age, body mass index (BMI), presence of diabetes and/or hypertension, surgical procedure, and anesthetic technique has not been well delineated.
METHODS: We conducted a retrospective chart review of the anesthetic records of all patients who underwent spine surgery and MEP monitoring of the lower extremities from August 1, 2001 to December 31, 2005. Patients with preexisting paralysis of the lower extremities were excluded. Univariate analysis was performed to examine the distribution of diabetes, hypertension, anesthesia technique, age, gender, BMI, and surgical procedure. The χ^2 test and the 2-sample t test were used to test associations between MEP status and potential risk factors. Cochran-Armitage test was used to analyze trends in BMI and age by quartile. The effects of diabetes and hypertension, compared with patients with neither, were presented for each anesthetic technique. Bivariate analysis of the data was performed to analyze a potentially synergistic deleterious effect of diabetes, hypertension, and anesthetic technique using the Breslow-Day test for homogeneity of the odds ratios. Logistic regression analysis through stepwise selection was performed to form a model of the data.
RESULTS: Two hundred fifty-six charts were reviewed. The univariate analysis showed that diabetes, hypertension, anesthesia technique, age, and BMI were significantly associated with failure to obtain MEP signals. None of the variables were found to have a synergistic effect on MEP signal attainment in the bivariate analysis. Hypertension, diabetes, and anesthetic technique were independent factors for MEP failure and their joint effects were additive not synergistic.
CONCLUSIONS: Diabetes, hypertension, and anesthetic technique were the most important patient risk factors associated with failure to obtain lower extremity MEP signals. These results will improve anesthesiologists' ability to tailor anesthetic regimen to patient comorbidity when MEP monitoring is planned.

隨機對照試驗中的混雜因素：鑒定，影響和潛在的解決方案

Practice Misalignments in Randomized Controlled Trials: Identification, Impact, and Potential Solutions

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在一個隨機對照試驗佇列中選擇一個合適的對照組對於實驗結果是至關重要的。對照組理想地包括並現實地反映了醫學實踐。這個目的可在常規的標準療法的研究中被挑戰。 為了消除臨床試驗設計中的異質性，最近對傳統療法的調查中採取隨機分配給患者固定的劑量。 雖然這種方法可能會產生顯著差異，結果可能無法可解釋或普及應用。
在這個佇列設計中，隨機化擾亂了重要臨床徵象與滴定療法之間的正常關係，並形成了各臨床研究的患者組，他們接受了不符合當前臨床實踐理論的治療劑量。 這些不合常規的組可能得到比傳統治療更差的結果。 實踐偏差可以發生在任何現有治療方法的臨床試驗中，這些療法通常是根據疾病嚴重程度或病人特點而調整的。在這項研究中，我們回顧最近 3 個隨機對照試驗來演示偏倚如何影響安全、結果及隨機對照試驗的結論的。 此外，我們討論可前瞻性地識別滴定療法和病人疾病的特性之間的關係的方法。最後，我們回顧試驗設計方案，他們可能會減少偏倚的發生和對實踐的影響。 由於這些設計可能會限制臨床試驗的可行性，一個傳統療法特徵對於確定這些設計中哪一個可以用來保護病人的安全是有必要建立的。
（張玥琪譯，薛張綱校)

Appropriate control group selection in a randomized controlled trial (RCT) is a critical factor in generating results, which are both interpretable and generalizable. Control groups ideally encompass and realistically reflect prevailing medical practices. This goal can be challenging in investigations of standard therapies that are routinely titrated. To eliminate the heterogeneity in clinical practice from the trial design, recent investigations of titrated therapies have randomized patients to fixed-dose regimens. Although this approach may produce statistically significant differences, the results may not be interpretable or generalizable.
In this trial design, randomization disrupts the normal relationship between clinically important characteristics and therapy titration, thereby creating subgroups of patients within each study arm that receive levels of therapy inconsistent with current practices outside of the clinical study. These misaligned subgroups may have worse outcomes than usual care. Practice misalignments can occur in any clinical trial of a preexisting therapy that is typically adjusted based on severity of illness or other patient characteristics.
In this study, we review three recent RCTs to demonstrate how practice misalignments can affect the safety, results, and conclusions of RCTs. Furthermore, we discuss methods to prospectively identify potentially important relationships between therapy titration and patient- and disease-specific characteristics. Finally, we review trial design options that may minimize the occurrence and impact of practice misalignments. Because these designs may limit the feasibility of a clinical trial, a thorough characterization of usual care is necessary to determine whether one of these designs should be used to protect patient safety.

在豬的心跳驟停模型中食管內檢測裝置產生的氣管內負壓導致氣管壁塌陷

Negative Intratracheal Pressure Produced by Esophageal Detector Devices Causes Tracheal Wall Collapse in a Porcine Cardiac Arrest Model

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背景：食管內檢測裝置對氣管或食管施加負壓來驗正氣管內插管的位置。心跳驟停時食管下端括約肌的平滑肌發生時間依賴和不可逆的鬆弛。如果氣管後壁肌肉也發生鬆弛，將使得氣管因負壓而容易發生內陷或塌陷，從而可能接受假陰性的結果（氣管內插管，食管內檢測裝置顯示為食管）。我們比較了 3 種食管內檢測裝置正確區分氣管內和食管內插管的能力。

方法：將氣管導管插入 5 只馴養家豬的氣管和食管內，並且在測試 3 種食管內檢測裝置的同時用支氣管鏡顯示氣管。在誘導心跳驟停前後均監測氣管壁的活動。用逐漸增加的負壓給氣管內的氣管導管排氣，並記錄氣管壁開始運動和管腔發生>50%的閉塞時的壓力。測試在心跳驟停後 4、8 和 12 分鐘時重複進行，並確定心跳驟停前後氣管塌陷時的壓力。心跳驟停前和驟停後 6 分鐘、10 分鐘時也對食管內的氣管導管進行檢測。

結果：在一個封閉的系統內，每個食管內檢測裝置產生大於−100 cm H_2O 的壓力。心跳驟停前氣管塌陷的平均壓力為−112 cm H_2O。心跳驟停後 4、8 和 12 分鐘時氣管塌陷的平均壓力分別為−68, −66 和−54 cm H_2O。一個食管內檢測裝置始終給出模棱兩可的結果；剩餘的 2 個在所有的物件中都給出精確的結果。儘管氣管壁的活動在所有心跳驟停後的食管內檢測裝置測試中都有記錄到，但大多數觀察到的活動都不足以使檢測裝置失效。所有心跳驟停前後的食管內插管都被正確的判定出來。

結論：這些發現描述了心跳驟停時氣管後壁張力下降產生假陰性結果的機制。需要進一步的研究來闡明影響它發生的因素和對食管內檢查工具使用的影響。

（朱蘭芳譯，薛張綱校）

BACKGROUND: Esophageal detector devices (EDDs) impose negative pressure on the trachea or esophagus to verify endotracheal tube (ETT) position. In cardiac arrest, the smooth muscle of the lower esophageal sphincter relaxes in a time-dependent and irreversible manner. If relaxation also occurs in the muscular posterior tracheal wall, it could predispose tracheal invagination or collapse with negative pressure, potentially yielding false-negative (tracheal ETT, EDD indicates esophagus) results. We compared 3 different EDDs in their ability to correctly discriminate tracheal and esophageal intubation.

METHODS: ETTs were placed into the trachea and esophagus of 5 domestic swine, and bronchoscopy was used to visualize the trachea while 3 EDDs were tested. Tracheal wall activity was observed before and after induced cardiac arrest. Tracheal ETTs were aspirated with increasing negative force and pressures at initial wall movement and >50% tracheal lumen obliteration were recorded. Measurements were repeated at 4, 8, and 12 minutes postarrest and pressures at tracheal wall collapse pre- and postarrest were determined. EDDs were also tested on esophageal ETTs prearrest and at 6 and 10 minutes postarrest.

RESULTS: In a closed system, each EDD generated more than −100 cm H_2O pressure. Average prearrest pressure at tracheal collapse was −112 cm H_2O. Average postarrest collapse pressures were −68, −66, and −54 cm H_2O at 4, 8, and 12 minutes postarrest. One EDD consistently gave equivocal results; the remaining 2 gave accurate results in all subjects. Most observed movement was insufficient to cause device failure although tracheal wall movement was noted in all postarrest EDD trials. Esophageal intubation was correctly determined at all times pre- and postarrest.
CONCLUSION: These findings describe a mechanism for false-negative results from decreased posterior tracheal wall tone during cardiac arrest. Further studies are required to elucidate factors contributing to its occurrence and impact on EDD use.

比較羅派卡因和布比卡因應用於產科鎮痛

Ropivacaine Versus Bupivacaine for Epidural Labor Analgesia

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臨產孕婦常使用椎管內鎮痛的方法。很多年來，由於布比卡因作用時間較長、沒有過度運動阻滯、且對胎兒及新生兒影響較小而被用來鎮痛。然而，布比卡因的心臟毒性較大，且布比卡因的運動阻滯作用仍是問題。很多局麻藥如布比卡因存在兩種形式，即左旋及右旋。羅派卡因，一種醯胺類局麻藥僅生產出左旋結構，從而避免了對布比卡因有所顧慮的問題。在這篇文章中，我們比較了羅派卡因和布比卡因應用於產科鎮痛的各自優點。我們發現羅派卡因應用於產科鎮痛並沒有顯著優點。（陳珺珺譯 薛張綱校）

Neuraxial analgesia is frequently administered to women in labor. For many years, bupivacaine has been used because of its long duration of action, lack of excessive motor block, and minimal fetal and neonatal effects. However, bupivacaine is one of the most cardiotoxic local anesthetics in current use and motor block is still a problem. Many local anesthetics such as bupivacaine exist in 2 forms, levorotatory and dextrorotatory. Ropivacaine, an amide local anesthetic produced in the pure levorotatory form addresses some of the concerns related to bupivacaine. In this article, we present the literature comparing ropivacaine and bupivacaine to determine whether there is an advantage to using one of these local anesthetics for labor analgesia. We found that there is no advantage to the routine use of ropivacaine for labor analgesia.

缺血預處理減弱單側大腿止血帶造成的缺血再灌注損傷所致的肺功能不全

Ischemic Preconditioning Attenuates Pulmonary Dysfunction After Unilateral Thigh Tourniquet–Induced Ischemia–Reperfusion

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背景：急性肺損傷是下肢缺血再灌注後常見的併發症，它在實驗及臨床處理主動脈手術中被證實。在矯形手術中使用止血帶可以出現缺血再灌注損傷。我們研究了單側大腿使用止血帶後導致缺血再灌注損傷對肺功能的影響，及缺血預處理對於肺功能惡化起到的作用。
方法：30 名 ASA I 或 II 級行下肢手術的患者隨機分為兩組：使用止血帶造成下肢缺血再灌注損傷（缺血再灌注組，n＝15）和使用止血帶交替缺血及再灌注三個迴圈、每次 5 分鐘的缺血預處理組（預處理組，n＝15）。在止血帶打氣前、打氣後 1 小時、2 小時、6 小時及 24 小時分別測定血氣、血漿丙二醛、血清 IL-6、IL-8、和 IL-10。並計算動脈－肺泡氧分壓比值、肺泡－動脈血氧分壓差及呼吸指數。
結果：與基礎值相比教，動脈血 Po_2 和動脈血－肺泡氧分壓比值均降低，而肺泡－動脈氧分壓差和呼吸指數在使用止血帶後 6 小時均增加($P < 0.01$)。然而，相比於比較缺血再灌注組，缺血預處理組上述變化較小($P < 0.01$)。同樣，血漿丙二醛、血清 IL-6、IL-8、和 IL-10 的增加在止血帶打氣後 2 小時到 24 小時變化較小。
結論：下肢手術使用止血帶可以造成下肢缺血再灌注損傷，從而損傷肺氣交換的能力。止血帶缺血預處理可以減弱脂質過氧化及系統性炎症反應，從而減輕肺功能下降。
（陳珺珺譯 薛張綱校）

Background: Acute lung injury is a recognized complication of lower limb ischemia–reperfusion that has been demonstrated experimentally and in the clinical setting of aortic surgery. The application of a tourniquet can cause lower limb ischemia–reperfusion in orthopedic surgery. We studied the effect of unilateral thigh tourniquet–induced lower limb ischemia–reperfusion on pulmonary function, and the role of ischemic preconditioning in attenuating pulmonary dysfunction.
Methods: Thirty ASA I or II patients scheduled for lower extremity surgery were randomized into 2 groups: a limb ischemia–reperfusion group with tourniquet application (ischemia–reperfusion group, n = 15) and an ischemia preconditioning group (preconditioning group, n = 15), in which patients received 3 cycles of 5 minutes of ischemia, alternating with 5 minutes of reperfusion before extended use of the tourniquet. Blood gas, plasma malondialdehyde, and serum interleukin-6 (IL-6), IL-8, and IL-10 levels were measured just before tourniquet inflation, 1 hour after inflation and 2 hours, 6 hours, and 24 hours after tourniquet deflation. Arterial–alveolar oxygen tension ratio, alveolar–arterial oxygen tension difference, and respiratory index also were calculated.
Results: In comparison with the baseline values, arterial Po_2 and arterial–alveolar oxygen tension ratio were decreased, while alveolar–arterial oxygen tension difference and respiratory index were increased significantly 6 hours after tourniquet deflation in both groups ($P < 0.01$). However, these changes were less significant in the ischemic preconditioning group than those in the lower limb ischemia-reperfusion group ($P < 0.01$). Similarly, the increases in the malondialdehyde, IL-6, and IL-8 from 2 hours to 24 hours

after release of the tourniquet in the lower limb ischemia–reperfusion group were attenuated by ischemic preconditioning.
Conclusions: Pulmonary gas exchange is impaired after lower limb ischemia–reperfusion associated with the clinical use of a tourniquet for lower limb surgery. Ischemic preconditioning preceding tourniquet-induced ischemia attenuates lipid peroxidation and systemic inflammatory response and mitigates pulmonary dysfunction.

從脊髓小膠質細胞釋放的前列腺素 E2 和笑氣是依賴於 p38 細胞分裂素活化蛋白激酶的啟動

Release of Prostaglandin E_2 and Nitric Oxide from Spinal Microglia Is Dependent on Activation of p38 Mitogen-Activated Protein Kinase

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背景：脊髓通過釋放前列腺素(PGs), 氧化亞氮(NO)和細胞因數處理傷害性刺激小膠質細胞。小膠質細胞可能產生這些興奮介質前體。小膠質細胞擁有 Toll 樣受體 4 (TLR4)和神經激肽 1（NK1）受體，這兩個受體在外周神經損傷激炎症介導的脊髓致敏方面起到重要作用。相應的，我們測定了被各自靶目標啟動的級聯反應，它促使培養的大鼠脊髓小膠質細胞釋放 PGE_2，並增加亞硝酸鹽(NO_2^-) (NO 的一種標記)。
方法：從 Sprague–Dawley 新生鼠身上分離出來的脊髓小膠質細胞通過幾種方式培養：脂多糖(LPS)或 P 物質（SP）單獨培養, LPS 和 SP 混合培養，LPS 和環氧合酶抑制劑 (COX)、NO 合酶 2 (NOS2)或 p38 細胞分裂素活化蛋白激酶(p38)或米諾環素中培養 24 小時和 48 小時。使用酶免疫測定法和比色法分別測定培養基表面的 PGE_2 和 NO_2^- 濃度。
結果：應用 of LPS (一種 TLR4 配位體, 0.1 到 10 ng/mL) 培養小膠質細胞可以生成劑量和時間依賴性增長的 PGE_2 和 NO_2^- 產物，然而單獨使用 SP 培養基（一種 NK1 顯效劑, 濃度到 10^{-5} M）或混合使用 LPS 沒有觀察到上述現象。對照試驗使用 SC-560 (COX-1 抑制劑)和 SC-236 (COX-2 抑制劑)顯示 LPS 導致的 PGE_2 釋放可以通過 COX-1 和 COX-2 增殖。LPS 導致的 NO 釋放可以被 1400W,一種 NOS2 抑制劑抑制。米諾環素，一種阻斷小膠質細胞活化的物質，SB203580, 一種 p38 抑制劑都可以減弱 LPS 導致的 PGE_2 和 NO 釋放。1400W, 在抑制 NO 釋放的劑量也可以阻斷 PGE_2 釋放。
結論：我們發現（a）通過 TLR4 而不是 NK1 受體啟動的脊髓小膠質細胞可以產生 PGE_2 和 NO； (b)通過 COX-1 和 COX-2 可以誘發釋放 PGE_2； (c) COX-PGE_2 通路可以被 p38 和 NOS2 調節。通過我們先前的在體試驗，最近的發現強調了脊髓小膠質細胞表達的 p38 是調節前傷害性刺激的分子如 PGE_2 和 NO 的關鍵。
（陳珺珺譯 薛張綱校）

BACKGROUND: The spinal release of prostaglandins (PGs), nitric oxide (NO), and cytokines has been implicated in spinal nociceptive processing. Microglia represent a possible cell of origin for these proexcitatory mediators. Spinal microglia possess Toll-like receptor 4 (TLR4) and neurokinin 1 (NK1) receptors, and both receptors play a significant role in peripheral nerve injury- and inflammation-induced spinal sensitization. Accordingly, we examined the properties of the cascades activated by the respective targets, which led to the release of PGE_2 and an increase in nitrite (NO_2^-) (a marker of NO) from cultured rat spinal microglia.
METHODS: Spinal microglia isolated from Sprague–Dawley neonatal rats were cultured with lipopolysaccharide (LPS) or substance P (SP) alone, with LPS in combination with SP, and with LPS in the presence of each inhibitor of cyclooxygenase (COX), NO synthase 2 (NOS2) or p38 mitogen-activated protein kinase (p38), or minocycline for 24 hours and 48 hours. Concentrations of PGE_2 and NO_2^- in culture supernatants were measured using an enzyme immunoassay and a colorimetric assay, respectively.
RESULTS: Application of LPS (a TLR4 ligand, 0.1 to 10 ng/mL) to cultured microglia produced a dose- and time-dependent increase in PGE_2 and NO_2^- production, whereas no effects were observed after incubation with SP (an NK1 agonist, up to 10^{-5} M) alone or in combination with LPS. Antagonist studies with SC-560 (COX-1 inhibitor) and SC-236 (COX-2 inhibitor) showed that LPS-induced PGE_2 release was generated from both COX-1 and COX-2. LPS-induced NO release was suppressed by 1400W, an inhibitor of NOS2. Minocycline, an agent blocking microglial activation, and SB203580, an inhibitor of p38, both attenuated the LPS-induced PGE_2 and NO release. The 1400W, at the doses that suppressed NO release, also blocked increased PGE_2 release.
CONCLUSIONS: Our findings suggest that (a) activation of spinal microglia via TLR4 but not NK1 receptors produces PGE_2 and NO release from these cells; (b) the evoked PGE_2 release is generated by both COX-1 and COX-2, and (c) the COX-PGE_2 pathway is regulated by p38 and NOS2. Taken together with our previous in vivo work, the current findings emphasize that p38 in spinal microglia is a key player in regulating production of pronociceptive molecules, such as PGE_2 and NO.