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當不能選擇血液時：54 名危及生命的貧血患者運用基於血紅蛋白的載氧溶液後存活的影響因素

When Blood Is Not an Option: Factors Affecting Survival After the Use of a Hemoglobin-Based Oxygen Carrier in 54 Patients with Life-Threatening Anemia

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背景：在經得同意的耶和華見證會中以及其他一些對血液有禁忌或不能取得血液的患者中，在治療基礎疾病時運用基於血紅蛋白的載氧溶液（HBOC）-201 可以使急性貧血的患者得以存活。

方法：在一個多中心、不設盲系列的重度貧血的“同情使用”患者中由初學使用者鑒定生存的影響因素，這些患者接受可以得到的標準治療加上由會診醫生支持的 HBOC-201。尋找預後的預計因數，並在存活者與非存活者之間比較。用一個複合的參數血紅蛋白-持續時間短缺乘積來描述貧血嚴重程度以及病程的相互臨床影響作用。從患者的記錄中測定死亡率、患者特點之間的相互關係以及存活出院率。

結果：54 名具有威脅生命的貧血患者（年齡中位數 50 歲，請求時的血紅蛋白濃度中位數 4g/dL）接受 60 到 300g HBOC-201。23 名患者（41.8%）出院。術中失血（45%）、惡性腫瘤(18%)和急性溶血（13%）是貧血的主要原因。從貧血發生（≤8 g/dL）到輸注 HBOC-201 時間在存活組較非存活組短(3.2 比 4.4 天, P = 0.027)。HBOC-201 輸注前平均血紅蛋白的水準在存活組與未存活組分別是 4.5g/dL 和 3.8g/dL（P = 0.120）。沒有由於 HBOC-201 引起的嚴重不良事件。血紅蛋白－持續時間短缺乘積區分存活者與未存活者。腫瘤以及腎臟疾病和未存活組有關。

結論：與晚期比較，早期由無經驗的使用者對貧血患者使用 HBOC-201，可以改善急性出血以及溶血患者的存活機會。若在運用 HBOC-201 治療前將低血紅蛋白血症的持續時間以及嚴重程度減到最低，那麼存活還是大有可能的。

(龔寅 譯，馬皓琳/李士通校)

BACKGROUND: In consenting Jehovah's Witness patients and others for whom blood is contraindicated or not available, hemoglobin-based oxygen carrier (HBOC)-201 may enable survival in acutely anemic patients while underlying conditions are treated.
METHODS: Survival factors were identified in a multicenter, unblinded series of severely anemic “compassionate use” patients receiving available standard treatment plus consultant-supported HBOC-201 administration by novice users. Predictors of outcome were sought and compared between survivors and nonsurvivors. A compound variable, hemoglobin-duration deficit product was used to describe the interactive clinical effects of severity and duration of anemia. Mortality, correlations between patient characteristics, and survival to hospital discharge were determined from patient records.
RESULTS: Fifty-four patients (median age 50 years) with life-threatening anemia (median hemoglobin concentration at time of request = 4 g/dL) received 60 to 300 g HBOC-201. Twenty-three patients (41.8%) were discharged. Intraoperative blood loss (45%), malignancy (18%), and acute hemolysis (13%) were the prevailing reasons for anemia. Time from onset of anemia (≤8 g/dL) to HBOC-201 infusion was shorter for survivors than nonsurvivors (3.2 vs 4.4 days, P = 0.027). Mean hemoglobin levels before HBOC-201 infusion in survivors and nonsurvivors were 4.5 and 3.8 g/dL, respectively (P = 0.120). No serious adverse event was attributed to HBOC-201. The hemoglobin-duration deficit product separated survivors from nonsurvivors. Cancer and renal disease were associated with nonsurvival.
CONCLUSION: Earlier, compared with later, administration by inexperienced users of HBOC-201 to patients with anemia was associated with improved chances of survival of acutely bleeding and hemolyzing patients. Survival was more likely if the duration and magnitude of low hemoglobin was minimized before treatment with HBOC-201.

嬰兒和兒童常規麻醉中一氧化碳的監測

Detection of Carbon Monoxide During Routine Anesthetics in Infants and Children

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Anesth Analg 2010; 110:747-753

背景：在吸入麻醉藥被乾燥的二氧化碳吸收劑降解的過程中，麻醉回路中會產生一氧化碳（CO），低流量麻醉時，呼出的 CO 會潛在地被人體再吸入。發育中的大腦接觸了低濃度的 CO（12.5ppm）會產生神經毒性作用，而且可能導致神經發育的損害。本次研究中，我們對嬰兒和兒童實施全身吸入麻醉，並在呼吸回路中安放了新的含強鹼金屬的二氧化碳吸收劑，目標就是要對回路中存在的 CO 進行定量，並確定與檢測到的 CO 水準有關係的變數。

方法：在這個觀察研究中，15 個嬰兒和兒童（年齡在 4 個月-8 歲）予吸入誘導後施行全身吸入麻醉，然後對他們進行評估。在全麻過程中，每隔 5 分鐘在麻醉回路的吸入端即時測量 CO 的濃度，持續 1 小時。在 1 小時的時點檢測血中碳氧血紅蛋白（COHb）的水準，並與基礎值比較。
結果：CO 可以在每個 2 歲以上小兒中被檢測到（0 – 18 ppm, mean 3.7 ± 4.8 ppm），而 2 歲以下小兒卻很少檢測到（0 – 2 ppm, mean 0.2 ± 0.6 ppm）。縱向回歸分析調整後，只有 CO 的濃度和 FGF:Ve（新鮮氣流量和分鐘通氣量的比值）之間的關係有顯著意義（P < 0.001）。雖然沒有有力的證據，但是 CO 的濃度與地氟醚的使用及患者性別也有一定的關係。而 CO 的濃度和麻醉藥的濃度之間沒有顯著的關係。2 歲以下小兒 COHb 基礎值水準較 2 歲以上小兒要高，在吸入麻醉 1 小時後，血中 COHb 水準與基礎值和 2 歲以上小兒相比明顯降低。然而在 2 歲以上小兒，隨著吸入 CO 增加，COHb 水準較基礎值以可預計的方式與之一致地明顯上升。單一的線性回歸分析，FGF:Ve 與 COHb 的變化顯著相關。(r = 0.62; P < 0.02)。
結論：當 FGF:Ve <1 時，可以在全麻的嬰兒和兒童中常規檢測到 CO。在麻醉呼吸回路中檢測到的 CO 峰值水準在被認為會對發育中的大腦造成損害的範圍內。對於確定檢測到的 CO 的來源（CO 是揮發性麻醉藥降解產生，還是來自內源性 CO 複吸，或是兩者都有）則需要更進一步的研究。然而這些發現提示，避免低流量麻醉可以預防呼出的 CO 再吸入；以及如果檢測到的 CO 可歸咎於揮發性麻醉藥的降解，那麼使用缺乏強金屬氫氧化物的二氧化碳吸收劑可以限制吸入的 CO。
(徐妍君 譯，馬皓琳/李士通 校)

BACKGROUND: Carbon monoxide (CO) can be produced in the anesthesia circuit when inhaled anesthetics are degraded by dried carbon dioxide absorbent and exhaled CO can potentially be rebreathed during low-flow anesthesia. Exposure to low concentrations of CO (12.5 ppm) can cause neurotoxicity in the developing brain and may lead to neurodevelopmental impairment. In this study, we aimed to quantify the amount of CO present within a circle system breathing circuit during general endotracheal anesthesia in infants and children with fresh strong metal alkali carbon dioxide absorbent and define the variables associated with the levels detected.
METHODS: Fifteen infants and children (aged 4 months to 8 years) undergoing mask induction followed by general endotracheal anesthesia were evaluated in this observational study. CO was measured in real time from the inspiratory limb of the anesthesia circuit every 5 minutes for 1 hour during general anesthesia. Carboxyhemoglobin (COHb) levels were measured at the 1-hour time point and compared with baseline.
RESULTS: CO was detected in all patients older than 2 years (0–18 ppm, mean 3.7 ± 4.8 ppm) and rarely detected in patients younger than 2 years (0–2 ppm, mean 0.2 ± 0.6 ppm). Only the relationship between CO concentration and fresh gas flow to minute ventilation ratio (FGF:Ve) remained significant after adjustment in longitudinal regression analysis (P < 0.001). Although not powered to determine such a relationship, CO levels were weakly associated with the use of desflurane and female sex. There was no significant association between CO concentration and anesthetic concentration. Baseline COHb levels were higher in children younger than 2 years and decreased significantly at the 1-hour time point compared with baseline and children older than 2 years. However, COHb levels increased significantly from baseline in a predictable manner consistent with CO exposure in children older than 2

years. FGF:V̇e correlated significantly with change in COHb using simple linear regression (r = 0.62; P < 0.02).
CONCLUSIONS: CO was detected routinely during general anesthesia in infants and children when FGF:V̇e was <1. Peak CO levels measured in the anesthesia breathing circuit were in the range thought to impair the developing brain. Further study is required to identify the source of CO detected (CO produced by degradation of volatile anesthetic versus rebreathing CO from endogenous sources or both). However, these findings suggest that avoidance of low-flow anesthesia will prevent rebreathing of exhaled CO, and use of carbon dioxide absorbents that lack strong metal hydroxide could limit inspired CO if detection was attributable to degradation of volatile anesthetic.

七氟醚對老年患者的 QTc 間期延長效果較年輕患者更加顯著

Sevoflurane Causes Greater QTc Interval Prolongation in Elderly Patients than in Younger Patients

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背景：七氟醚和氟呱利多均可造成病人 QT 間期延長，並且年齡的增長不僅是病人 QT 間期延長的因素之一，同時也是藥物引起 QT 間期延長的危險因素之一。本次研究中，我們對於七氟醚和氟呱利多對校正後 QT（QTc）間期和心室複極離散度（從 T 波峰值到 T 波結束的間期[Tp-e]）的作用，在年老和年輕患者之間進行了比較。
方法：在七氟醚（1.5%-2.5%）聯合止吐劑量氟呱利多（1.25mg）的麻醉下，我們對 30 例年老患者（70 歲及以上）和 30 例年輕患者（20-69 歲）進行了兩小時的觀察，並測量了 QT 間期和代表了跨心肌壁的透壁複極離散度的 Tp-e 間期。我們使用三個不同的公式依照心率校正 QT 間期：Bazett、Matsunaga 和 Van de Water。所用的資料以均數±標準差表示。
結果：年老患者組的平均年齡較年輕患者組大 24.4 歲（P<0.05）。兩組患者 QTc 間期在實施麻醉前無明顯差異。通過 3 個公式計算，年老患者組 QTc 間期在使用七氟醚後顯著延長（用 Bazett 公式計算後，QTc 間期在實施麻醉前和吸入七氟醚後 60、75、90 和 120 分鐘分別為 0.434 ± 0.028 秒、0.450 ± 0.037 秒、0.463 ± 0.037 秒、0.461 ± 0.037 秒以及 0.461 ± 0.038 秒）。七氟醚引起的年老患者組 QTc 間期延長較年輕患者組更加顯著(用 Bazett 公式計算後，吸入七氟醚 60 分鐘後為 0.450 ± 0.037 秒比 0.432 ± 0.034 秒；75 分鐘後為 0.463 ± 0.037 秒比 0.441 ± 0.037 秒；以及 120 分鐘後為 0.461 ± 0.038 秒比 0.436 ± 0.030 秒)，但延長吸入時間和使用氟呱利多均不能增大七氟醚引起的 QTc 間期延長的效果。兩組患者的 Tp-e 間期均未受顯著影響。
結論：七氟醚對老年患者的 QTc 間期延長效果較年輕患者更加顯著。儘管七氟醚並不影響透壁的複極離散度，並且延長吸入時間和使用氟呱利多均不能增大七氟醚誘導後的 QTc 間期延長的效果，我們在對年老患者使用七氟醚麻醉時仍應當嚴密監測患者 QT 間期的延長以及與之相關的心律失常。
(劉伍 譯，馬皓琳/李士通 校)

BACKGROUND: Sevoflurane and droperidol prolong the QT interval, and advancing age is not only associated with a prolongation of the QT interval but is also a risk factor for drug-induced QT interval prolongation. In this study, we compared the effect of sevoflurane and droperidol on the corrected QT (QTc) interval and the dispersion of ventricular repolarization (time interval from the peak to the end of the T wave [Tp-e]) in elderly patients with those in younger patients.
METHODS: Under sevoflurane anesthesia (1.5%–2.5%) with an antiemetic dose of droperidol (1.25 mg), the QT interval and the Tp-e interval, which indicates transmural dispersion of repolarization across the myocardial wall, were measured in 30 elderly patients (70 years and older) and in 30 younger patients (20–69 years) for 2 hours. The QT interval was normalized for heart rate (QTc) using 3 different formulas: Bazett, Matsunaga, and Van de Water. Data are presented as mean ± sd.
RESULTS: The elderly group was 24.4 years older ($P < 0.05$) than the younger group. The QTc intervals in the 2 groups before anesthesia were not significantly different. Using all 3 formulas, the QTc interval in the elderly patient group was significantly prolonged by sevoflurane (the QTc intervals at preanesthesia and 60, 75, 90, and 120 minutes after sevoflurane exposure were 0.434 ± 0.028 seconds, 0.450 ± 0.037 seconds, 0.463 ± 0.037 seconds, 0.461 ± 0.037 seconds, and 0.461 ± 0.038 seconds, respectively, with the Bazett formula). The sevoflurane-induced QTc interval prolongation in the elderly patient group was significantly greater than that in the younger patient group (0.450 ± 0.037 seconds vs 0.432 ± 0.034 seconds, 60 minutes after sevoflurane exposure; 0.463 ± 0.037 seconds vs 0.441 ± 0.037 seconds, 75 minutes after sevoflurane exposure; and 0.461 ± 0.038 seconds vs 0.436 ± 0.030 seconds, 120 minutes after sevoflurane exposure with the Bazett formula), but the sevoflurane-induced QTc interval prolongation was neither further enhanced with time nor by droperidol. The Tp-e interval was not affected in either group.
CONCLUSION: Sevoflurane causes greater QTc interval prolongation in elderly patients than in younger patients. Although sevoflurane does not affect the transmural dispersion of repolarization and sevoflurane-induced QTc prolongation does not advance with time and by droperidol administration, QT interval prolongation and its associated arrhythmias should be carefully monitored during sevoflurane anesthesia in elderly patients.

使用指示劑稀釋技術監測心輸出量：基礎理論、限制和展望

Cardiac Output Monitoring Using Indicator-Dilution Techniques: Basics, Limits, and Perspectives

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能夠監測心輸出量是評估心血管併發症發生風險較高尤其是在已經存在心血管合併症的危重病人血流動力學用以管理的重要基石之一。30 多年來，通過單次注射肺動脈導管熱稀釋測量來評估心輸出量已被廣泛接受為用於高級血流動力

學監測的“臨床標準”。 在這篇文章中，我們回顧了這一臨床標準以及當前也以指示劑稀釋技術為基礎的其他供選技術，如跨心肺熱稀釋技術和鋰稀釋技術。在這篇綜述裡，不僅概述了各種指示劑稀釋技術的基本技術原理和特點，而且也羅列了每種指示劑稀釋技術應用的局限性。
(滕凌雅 譯，馬皓琳/李士通 校)
The ability to monitor cardiac output is one of the important cornerstones of hemodynamic assessment for managing critically ill patients at increased risk for developing cardiac complications, and in particular in patients with preexisting cardiovascular comorbidities. For >30 years, single-bolus thermodilution measurement through a pulmonary artery catheter for assessment of cardiac output has been widely accepted as the “clinical standard” for advanced hemodynamic monitoring. In this article, we review this clinical standard, along with current alternatives also based on the indicator-dilution technique, such as the transcardiopulmonary thermodilution and lithium dilution techniques. In this review, not only the underlying technical principles and the unique features but also the limitations of each application of indicator dilution are outlined.

術中知曉的新分類方法

A Novel Classification Instrument for Intraoperative Awareness Events

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背景：有顯性回憶的術中知曉的發生率約為 1‰-2‰。由於發生率低，所以我們需要通過大量的研究資料來更好地理解術中知曉和後遺症。因此，知曉的一個標準化的描述和表達是很有價值的。
方法：我們創造了一個新的術中知曉的分類方法：0 級：沒有知曉；1 級：聽覺分離；2 級：觸覺（如外科操作或者氣管內導管）；3 級：疼痛；4 級：麻痹（如感覺不能移動、說話或呼吸）；5 級：疼痛和麻痹。另外還有一個“D”分級，指患者有害怕、焦慮、窒息、感覺不幸、瀕死感或其他明確的描述。我們回顧了 15 項研究術中知曉發生率並提供術中知曉報導的特別資訊的研究。3 個機構的 5 名瞭解分類方式的麻醉醫生獨立地對術中知曉進行分級。另有 20 位不瞭解分類方法的麻醉主治醫師、麻醉住院醫生、麻醉護士、醫學院學生和輔助者也獨立地對術中知曉進行分級。用 Fleiss's kappa 統計值來評價觀察者之間的一致性。
結果：151 位成人術中知曉者被確定為分析有效。基本的 1-5 級總 kapper 值為 0.851 (95% 可信區間 0.847–0.856)。包括額外的精神損失的總 Kapper 值為 0.779 (95%可信區間 0.776–0.783)。
結論：我們報導的這項新的術中知曉的分類方法有很好的觀察者間的一致性，並可能有助於術中知曉的研究。

(胡豔 譯，馬皓琳/李士通 校)

BACKGROUND: Intraoperative awareness with explicit recall occurs in approximately 1–2 cases per 1000. Given the rarity of the event, a better understanding of awareness and its sequelae will likely require the compilation of data from numerous studies. As such, a standard description and expression of awareness events would be of value.
METHODS: We developed a novel classification instrument for intraoperative awareness events: Class 0: no awareness; Class 1: isolated auditory perceptions; Class 2: tactile perceptions (e.g., surgical manipulation or endotracheal tube); Class 3: pain; Class 4: paralysis (e.g., feeling one cannot move, speak, or breathe); and Class 5: paralysis and pain. An additional designation of "D" for distress was also included for patient reports of fear, anxiety, suffocation, sense of doom, sense of impending death, or other explicit descriptions. We reviewed 15 studies of the incidence of awareness that provided specific information about awareness reports. Five anesthesiologists at three institutions who developed the categories independently classified the events. An additional 20 individuals (attending anesthesiologists, anesthesiology residents, nurse anesthetists, medical students, and ancillary staff) not involved in the development of the categories also independently classified the events. Fleiss's kappa statistic was used to evaluate inter-observer agreement.
RESULTS: One hundred fifty-one cases of intraoperative awareness in adults were identified as valid for analysis. The overall kappa value was 0.851 (0.847–0.856, 95% confidence interval) for the basic Classes 1–5. Including additional designations of emotional distress, the overall kappa value was 0.779 (0.776–0.783, 95% confidence interval).
CONCLUSION: We report a novel classification instrument for intraoperative awareness events that has excellent inter-observer agreement and that may facilitate the study of intraoperative awareness.

電阻加熱或強制氣流加溫預防再分佈低溫

Resistive-Heating or Forced-Air Warming for the Prevention of Redistribution Hypothermia

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背景：我們評價了在麻醉誘導前施行電阻加熱或強制氣流加溫以預防低體溫的效能，並與未進行預加熱進行對比。
方法：27 位患者擇期行腹腔鏡結直腸手術，隨機分入 3 組中的其中 1 組：無預加熱組；用 42°C 碳素纖維全身覆蓋預加熱 30min；手術前 30min42°C 強制氣流加溫。強制氣流加溫不包括肩膀、腳踝以及雙足。預加熱時間段精確地控制在 30min。在第 31min，啟動全憑靜脈麻醉技術，所有的病人應用電熱毯主動加熱。測量鼓膜溫度和食管遠端溫度。分類資料應用 χ2 檢驗分析，連續資料應用方差分析來分析。P <0.05 被認為有統計學意義。
結果：在麻醉 40min 至 90min，食管遠端溫度的平均值在對照組和碳纖維組之間有明顯差異。在麻醉 50min 後，對照組、碳纖維加熱組和強制氣流加溫組食道溫的平均值分別為 35.9°C ± 0.3°C、36.5°C ± 0.4°C 和 36.2°C ± 0.3°C。強制氣

流加溫組和對照組沒有統計學顯著差異。在電阻預加熱 30min 後，病人的鼻咽溫明顯高於對照組。
結論：當病人存在術後低體溫的風險時，預加熱必須作為麻醉處理的一部分。
(黃麗娜 譯， 馬皓琳/李士通 校)
BACKGROUND: We evaluated the efficacy of resistive-heating or forced-air warming versus no prewarming, applied before induction of anesthesia for prevention of hypothermia.
METHODS: Twenty-seven patients scheduled for laparoscopic colorectal surgery were randomized into 1 of 3 groups: no prewarming; 30 minutes of prewarming with a carbon fiber total body cover at 42°C; or 30 minutes of preoperative forced-air warming at 42°C. The forced-air warming cover excluded the shoulders, ankles, and feet. The prewarming period was exactly 30 minutes. At the 31st minute, a total IV anesthesia technique was initiated, and all patients were actively warmed with a lithotomy blanket. Tympanic and distal esophageal temperatures were measured. Categorical data were analyzed using $\chi 2$ test, and continuous data were analyzed with analysis of variance. $P < 0.05$ was considered statistically significant.
RESULTS: The mean esophageal temperatures differed significantly between the control and the carbon fiber group from 40 to 90 minutes of anesthesia. After 50 minutes of anesthesia, the mean esophageal temperatures in the control, carbon fiber, and forced-air groups were 35.9°C ± 0.3°C, 36.5°C ± 0.4°C, and 36.2°C ± 0.3°C, respectively. No statistically significant difference was found between the forced-air and control groups. After 30 minutes of prewarming with resistive heating, patients had an esophageal temperature that was significantly higher than the control group.
CONCLUSIONS: Prewarming should be considered part of the anesthetic management when patients are at risk for postoperative hypothermia.

通過抑制兔子一氧化氮合成酶，可以調節兔肝臟血流動力學對動脈二氧化碳分壓急性改變的反應

Modification of the Hepatic Hemodynamic Response to Acute Changes in Paco2 by Nitric Oxide Synthase Inhibition in Rabbits

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背景：已有報導高碳酸血症能調節肝臟迴圈。與此反應相關聯的血管調節機制仍有部分未明瞭。
方法：對兔子進行麻醉並且通氣，我們進行本研究目的是：1）在動脈二氧化碳分壓改變後（通過改變二氧化碳的吸氣分數），評估肝動脈和門靜脈血流速度的調整（20MHz 脈衝多普勒）；2)評估非依賴動脈二氧化碳分壓改變的 pH 的適當作用及門靜脈 CO2 的作用；3）觀察抑制一氧化氮合成酶對 CO2 導致的肝臟血流學調節的影響。
結果：隨著 Paco2 的增加（從 30.9 ± 5 mm Hg 增加到 77 ± 11 mm Hg），動脈血壓增加了 20%（$P < 0.01$），肝動脈血流速度增加了 90% ($P < 0.05$)，主動脈血流速度減少了 15%（$P < 0.05$）以及門靜脈血流速度較少了 40% （$P < 0.05$）。在開腹下，改變 pH 值（輸注 1ml 的 0.1N 鹽酸）或僅改變門靜脈 CO2(通過吸入

CO2 固定 Paco2) 對肝臟血流動力學沒有影響。使用一氧化氮合成酶抑制劑（N ω-硝基- L -精氨酸，2.5mg/kg）預處理能減少對高碳酸血症的全身反應，然而門靜脈的改變持續存在，肝動脈血流的增加受到大量的抑制。
結論：CO2 本身影響肝臟血流，是通過它的全身作用（很可能是通過化學反射）來實現的。一氧化氮並不調節 Paco2 急性變化引起的肝臟血流動力學的改變，但是它可能通過調節肝臟血管反應的幅度，來發揮其允許作用。
(王海濤 譯，馬皓琳/李士通 校)

BACKGROUND: Hypercapnia has been reported to modify liver circulation. The vascular regulations implicated in this response remain partly unknown.
METHODS: Using anesthetized and ventilated rabbits, we designed this study to evaluate the hepatic artery and portal vein blood flow velocity adjustments (20 MHz pulsed Doppler) after changes in Paco2 (by varying the inspiratory fraction of CO2) and to assess the proper role of pH, independent of Paco2 changes, the role of portal vein CO2, and the effect of nitric oxide synthase inhibition on CO2-induced modifications of hepatic hemodynamics.
RESULTS: Increasing Paco2 from 30.9 ± 5 mm Hg to 77 ± 11 mm Hg increased arterial blood pressure by 20% ($P < 0.01$) and hepatic artery blood flow velocity by 90% ($P < 0.05$) and decreased aortic blood flow velocity by 15% and portal vein blood flow velocity by 40% (both $P < 0.05$). Changes in pH (1 mL of 0.1 N hydrochloric acid infusion) or isolated changes in portal vein CO2 at constant Paco2 induced by CO2 insufflation in an open abdomen had no effect on hepatic hemodynamics. Pretreatment with a nitric oxide synthase inhibitor, Nω-nitro-l-arginine (2.5 mg/kg), blunted the systemic response to hypercapnia, whereas the portal modifications persisted, with a largely attenuated hepatic artery blood flow increase.
CONCLUSIONS: CO2 per se acts on hepatic blood flow by its systemic effect, probably via chemoreflexes. Nitric oxide does not mediate hepatosplanchnic hemodynamic modifications to acute changes in Paco2 but may play a permissive role by regulating the amplitude of hepatic vascular response.

比較擇期腦幕上腫瘤手術中 3%高張生理鹽水和甘露醇的腦減壓效果

A Comparison of 3% Hypertonic Saline and Mannitol for Brain Relaxation During Elective Supratentorial Brain Tumor Surgery

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背景：在本研究中，我們比較了腦幕上腫瘤手術中 3%高張生理鹽水(HTS)和 20%甘露醇的腦減壓效果、重症監護病房(ICU)停留時間及住院天數。
方法：這個前瞻、隨機、雙盲研究包括的病人選自於因腦幕上腫瘤擇期行顱骨切除術的病人。病人在開始劃頭皮時 5 分鐘輸注 160 mL 3%HTS (HTS 組, n =

122)或 150 mL 20%甘露醇(M 組, n = 116) 。動脈血 Pco2 維持在 35-40mmHg 之間，動脈血壓控制在基礎值±20%，手術期間液體正平衡維持在 2 mL/kg/h 的速度。資料記錄包括：輸液量、尿量、動脈血氣、血清鈉濃度、ICU 停留時間和住院天數。外科醫生在打開硬腦膜後即刻評估腦狀態：緊、適中或軟。
結果：HTS 組(軟/適中/緊, n = 58/43/21)的腦減壓效果比 M 組(軟/適中/緊, n = 39/42/35; P = 0.02)好。隨著時間的推移 HTS 組血清鈉水準比 M 組高(P < 0.001)。M 組的平均尿量(707 mL)高於 HTS 組(596 mL) (P < 0.001)。兩組在補液量、ICU 停留時間和住院天數上無顯著差異。
結論：我們的結果表明在擇期腦幕上腫瘤手術中 HTS 的腦減壓效果優於甘露醇，但是對 ICU 停留時間和住院天數無影響。
(周潔 譯，馬皓琳/李士通 校)
BACKGROUND: In this study, we compared the effects of 3% hypertonic saline (HTS) and 20% mannitol on brain relaxation during supratentorial brain tumor surgery, intensive care unit (ICU) stays, and hospital days.
METHODS: This prospective, randomized, and double-blind study included patients who were selected for elective craniotomy for supratentorial brain tumors. Patients received either 160 mL of 3% HTS (HTS group, n = 122) or 150 mL of 20% mannitol infusion (M group, n = 116) for 5 minutes at the start of scalp incision. The Pco2 in arterial blood was maintained within 35 to 40 mm Hg, arterial blood pressure was controlled within baseline values ±20%, and positive fluid balance was maintained intraoperatively at a rate of 2 mL/kg/h. Outcome measures included fluid input, urine output, arterial blood gases, serum sodium concentration, ICU stays, and hospital days. Surgeons assessed the condition of the brain as “tight,” “adequate,” or “soft” immediately after opening the dura.
RESULTS: Brain relaxation conditions in the HTS group (soft/adequate/tight, n = 58/43/21) were better than those observed in the M group (soft/adequate/tight, n = 39/42/35; P = 0.02). The levels of serum sodium were higher in the HTS group compared with the M group over time (P < 0.001). The average urine output in the M group (707 mL) was higher than it was in the HTS group (596 mL) (P < 0.001). There were no significant differences in fluid input, ICU stays, and hospital days between the 2 groups.
CONCLUSIONS: Our results suggest that HTS provided better brain relaxation than did mannitol during elective supratentorial brain tumor surgery, whereas it did not affect ICU stays or hospital days.

氯胺酮抑制轉錄因數活化劑蛋白-1 和核因數-κB，白介素-8 的產生以及 CD11b 和 CD16 的表達：關於人白細胞和白細胞系的研究

Ketamine Inhibits Transcription Factors Activator Protein 1 and Nuclear Factor-κB, Interleukin-8 Production, as well as CD11b and CD16 Expression: Studies in Human Leukocytes and Leukocytic Cell Lines

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背景：新近資料顯示氯胺酮可以發揮抗炎作用。然而，人們對於氯胺酮誘導的免疫調節信號機制知之甚少。我們在本實驗中研究了氯胺酮對人白細胞樣細胞系和全血中性粒細胞中脂多糖誘導的轉錄因數活化劑蛋白-1 (AP-1)和核因數-κB (NF-κB)的啟動作用的影響。
方法：採用電泳遷移率變動分析來研究氯胺酮對 U937 細胞中兩個轉錄因數的核結合活性的影響，運用全血流細胞計數法檢測白細胞中 AP-1 和 NF-κB 的含量。把具有不同的阿片和 NMDA 受體表達模式的細胞系用於逆轉錄多聚酶鏈反應（RT-PCR）以研究與氯胺酮信號有關的受體。利用全血化驗評估氯胺酮對白介素（IL）-8 產生的影響。
結果：氯胺酮以濃度依賴性的方式抑制兩個轉錄因數。這些作用不依賴于阿片和 NMDA 受體。氯胺酮同樣減少全血中 IL-8 的產生以及中性粒細胞中 CD11b 和 CD16 的表達。
結論：氯胺酮的免疫抑制作用至少部分是因為抑制了轉錄因數 NF-κB 和 AP-1，而後二者具有調節促炎調質產生的作用。然而，正是中樞神經系統中存在的不同於這些的信號機制在氯胺酮介導的免疫調節中起了很大的作用。
(江繼宏 譯，馬皓琳/李士通 校)
BACKGROUND: Recent data indicate that ketamine exerts antiinflammatory actions. However, little is known about the signaling mechanisms involved in ketamine-induced immune modulation. In this study, we investigated the effects of ketamine on lipopolysaccharide-induced activation of transcription factors activator protein 1 (AP-1) and nuclear factor-κB (NF-κB) in human leukocyte-like cell lines and in human blood neutrophils.
METHODS: Electric mobility shift assays were used to investigate ketamine's effects on nuclear binding activity of both transcription factors in U937 cells, and a whole blood flow cytometric technique was used for AP-1 and NF-κB determination in leukocytes. Cell lines with different expression patterns of opioid and N-methyl-d-aspartate receptors were used for reverse transcription–polymerase chain reaction to investigate receptors involved in ketamine signaling. Ketamine's effect on interleukin-8 production was assessed in a whole blood assay.
RESULTS: Ketamine inhibited both transcription factors in a concentration-dependent manner. These effects did not depend on opiate or N-methyl-d-aspartate receptors. Ketamine also reduced interleukin-8 production in whole blood and expression of CD11b and CD16 on neutrophils.
CONCLUSION: The immunoinhibitory effects of ketamine are at least in part caused by inhibition of transcription factors NF-κB and AP-1, which regulate production of proinflammatory mediators. However, signaling mechanisms different from those present in the central nervous system are responsible for ketamine-mediated immunomodulation.

一種簡單的不需要幾何計算或多重定標的坐骨神經定位方法

A Simple Approach to the Sciatic Nerve That Does Not Require Geometric Calculations or Multiple Landmarks

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背景：坐骨神經阻滯對於使用外周神經封閉而達到下肢遠端完全無痛是必要的。新鮮屍體解剖和病人身上均可根據坐骨結節來定位坐骨神經，本研究對比了坐骨神經阻滯的傳統方法和我們的實驗方法。特別檢驗了在患者保持俯臥位時，我們的新方法（進針點改為側偏坐骨結節 3cm）進針次數較少且需時較少的假設。
方法：根據 20 例屍體解剖得到坐骨結節來定位坐骨神經，這一研究結果被用於設計坐骨神經定位的替代方法。在一項隨機、對照、交叉的研究中，我們比較了俯臥位臀下進針法（傳統方法，n=19）和患者俯臥位時進針點側偏坐骨結節中點 3cm 的實驗方法（n=20）。我們記錄了進針次數及在 1.5 mA 以及<0.5 mA 電流刺激下首次得到坐骨神經顫搐所花的時間。
結果：俯臥位元屍體解剖結果顯示，坐骨神經與坐骨結節中點平均距離為 2.8 ± 0.4 cm。當從體表標誌進針時，實驗組進針總是橫切坐骨神經。相反，採用傳統方法的進針則偏離坐骨神經 2.27 ± 0.47 cm。臨床上，我們的實驗方法比傳統方法達到坐骨神經抽搐的穿刺次數較少。55%採用傳統進針方式的患者因得不到坐骨神經抽搐而改為實驗方法進針。無論是原先就分配到實驗組還是那些因傳統方法失敗而轉為實驗方法的患者，我們都觀察到分別有 45%和 85%的患者在進針 1 次和 3 次時得到首次坐骨神經抽搐。
結論：我們描述了一個比俯臥位臀下進針法更有效的定位坐骨神經的體表標誌。
(楊秀娟 譯，馬皓琳/李士通 校)
BACKGROUND: Blockade of the sciatic nerve is necessary for complete analgesia of the lower extremity using peripheral nerve blocks. We identified the sciatic nerve in relation to the ischial tuberosity in fresh cadaver dissections as well as in patients to compare sciatic nerve blockade using the conventional approach versus our experimental approach. Specifically, we tested the hypothesis that in patients in the prone position, our novel approach (changing the point of needle insertion to 3 cm lateral from the ischial tuberosity) requires fewer needle passes and less time.
METHODS: The location of the sciatic nerve in relation to the ischial tuberosity was identified in 20 cadavers; this information was used to devise an alternative approach to the sciatic nerve. In a randomized, controlled, crossover patient study, we compared a prone subgluteal approach (conventional approach, n = 19) with an experimental approach with the insertion point 3 cm lateral to the midpoint of ischial tuberosity with patients in prone position (n = 20). We recorded the number of passes and the time taken to obtain an initial sciatic nerve twitch at a current of 1.5 mA and a twitch at <0.5 mA.
RESULTS: The sciatic nerve averaged 2.8 ± 0.4 cm from the midpoint of ischial tuberosity in cadavers in prone position. When needles were inserted from surface landmarks, those inserted through the experimental insertion point consistently transected the sciatic nerve. In contrast, needles inserted through the conventional approach were 2.27 ± 0.47 cm lateral to the sciatic nerve. Clinically, our experimental approach required fewer passes to obtain a sciatic nerve twitch than the conventional approach. We were unable to obtain a twitch in 55% of patients with the conventional

approach and converted them to the experimental approach. In patients originally assigned to the experimental approach and those switched to the experimental approach after failure with the conventional approach, we obtained the first sciatic nerve twitch in 1 pass in 45% of the patients and in 3 passes in 85%.
CONCLUSIONS: We describe a landmark that is more effective for identifying the location of the sciatic nerve than that used for the prone subgluteal approach.

使用多極全血凝集法作為床邊監測評估去氨加壓素對心臟術後血小板功能異常的作用

A Point-of-Care Assessment of the Effects of Desmopressin on Impaired Platelet Function Using Multiple Electrode Whole-Blood Aggregometry in Patients After Cardiac Surgery

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背景：心臟術後出血可能由於體外迴圈後血小板獲得性功能障礙引起的。血小板功能的監測對於臨床上鑒定這類患者的血小板功能障礙是非常重要的。1-脫氨-8-d-精氨酸血管加壓素（醋酸去氨加壓素，去氨加壓素）已被證明可以增強血小板功能，減少血小板功能異常患者的血液丟失。在這項研究中，作者研究了多極全血凝集法（MEA）對於體外迴圈後血小板功能障礙檢測的可行性並以此監測去氨加壓素的療效。
方法：連續 58 例心臟術後前兩個小時失血超過 150ml/h 的患者，作為篩選血小板功能障礙群體。 22 例患者確定疑有血小板功能障礙。血小板功能障礙假設為：常規凝血分析（血小板計數，活化部分凝血活酶時間，國際標準化比值和纖維蛋白原）結果異常沒有達到需要輸注異體血製品的程度，且沒有可疑的外科原因。非隨機方法選擇 11 例患者接受 0.3ug/kg 去氨加壓素， 11 例沒有採取治療。在術前和術後 2h 分別使用凝血酶受體啟動肽（TRAPtest，32 μM），二磷酸腺苷（ADPtest，6.4 μM）和花生四烯酸（ASPItest，0.5 mM）激發後行 MEA 評估。記錄常規的實驗室參數。Mann-Whitney 法檢測組間的差異，以及 Wilcoxon 法檢測干預前後的差異。
結果：所有入組的患者顯示血小板功能障礙，在 MEA 中表現為干預前血小板聚集受損。去氨加壓素組藥物干預後血小板功能改善，結果分別為：1）ASPI 激發後 MEA 評估干預後 49 U [30/72 U]，干預前 15 U [8/21 U] [P < 0.001]，（結果用中位數表述[第 25 百分位/第 75 百分位值]）; 2）ADP 激發後 MEA 評估干預後 35 U [24/54 U] 干預前為 14 U [7/28 U] [P = 0.002]; 3）TRAP 激發後 MEA 評估干預後 85 U [66/115 U] ，干預前 64 U [26/88 U] [P = 0.007])。與此相反，在對照組中 MEA 保持不變。結果分別為：1）ASPI 激發後 MEA 評估干預後(22 U [10/50 U] 干預前 33 U [14/57 U] [P = 0.175]; 2)ADP 激發後 MEA 評估干預後 17 U [12/20 U] ，干預前 14 U [10/28 U] [P = 0.147]; 3）TRAP 激發後 MEA 評估干預後 65 U [41/89 U] 對比干預前 57 U [30/91 U] [P = 0.123])。

結論：心臟手術後血小板功能障礙，可在床邊用 MEA 進行評估。使用 MEA 可觀察到去氨加壓素對受損的血小板功能的影響，表現為使用啟動物後血小板聚集顯著改善。這個裝置對於確定 DDAVP 治療的可能受益物件是非常有用的。(張蕾 譯，陳傑 校)

BACKGROUND: Blood loss after cardiac surgery can be caused by acquired platelet dysfunction after cardiopulmonary bypass. Monitoring of platelet function is clinically important for the identification of patients experiencing such platelet dysfunction. 1-Deamino-8-d-arginine vasopressin (desmopressin acetate, DDAVP) has been shown to augment platelet function and to reduce blood loss in patients with platelet dysfunction. In this study, we examined the feasibility of whole blood multiple electrode aggregometry (MEA) for the detection of cardiopulmonary bypass–induced platelet dysfunction and investigated its ability to monitor DDAVP treatment.

METHODS: Fifty-eight consecutive patients with blood loss exceeding 150 mL/h in the first 2 consecutive hours after cardiac surgery were screened for suspected isolated platelet dysfunction. Twenty-two patients had suspected isolated platelet dysfunction and were enrolled in the study. Platelet dysfunction was assumed if conventional coagulation analyses (platelet count, activated partial thromboplastin time, international normalized ratio, and fibrinogen) did not show abnormal values as d for transfusion of allogenic blood products, and no surgical cause of bleeding was suspected. Eleven patients received 0.3 μg/kg DDAVP, and 11 patients received no therapy in a nonrandomized manner. MEA was performed after stimulation with thrombin receptor–activating peptide (TRAPtest, 32 μM), adenosine diphosphate (ADPtest, 6.4 μM), and arachidonic acid (ASPItest, 0.5 mM) before and 2 hours after intervention. Conventional laboratory variables were recorded. The Mann-Whitney test was used to detect differences between the groups, and the Wilcoxon test was used to detect differences before and after intervention.

RESULTS: All enrolled patients showed platelet dysfunction that manifested as impaired platelet aggregation in MEA before intervention. After the intervention, platelet function improved in the DDAVP group (49 U [30/72 U], median [25th/75th percentile] postintervention vs 15 U [8/21 U] preintervention for the ASPItest [P < 0.001]; 35 U [24/54 U] vs 14 U [7/28 U] for the ADPtest [P = 0.002]; and 85 U [66/115 U] vs 64 U [26/88 U] for the TRAPtest [P = 0.007]). In contrast, MEA remained unchanged in the control group (22 U [10/50 U] postintervention vs 33 U [14/57 U] preintervention for the ASPItest [P = 0.175]; 17 U [12/20 U] vs 14 U [10/28 U] for the ADPtest [P = 0.147]; and 65 U [41/89 U] vs 57 U [30/91 U] for the TRAPtest [P = 0.123]).

CONCLUSIONS: Impaired platelet function after cardiac surgery can be assessed at the bedside using MEA. The effect of DDAVP on impaired platelet function can also be detected as significant improvement in platelet aggregation to all activators. This device might be helpful for the identification of patients who may benefit from DDAVP therapy.

水合氯醛用於早產兒和足月兒鎮靜的療效和併發症的分析

Chloral Hydrate Sedation in Term and Preterm Infants: An Analysis of Efficacy and Complications

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背景：早產兒和足月兒在全麻後有發生呼吸暫停的潛在風險。對於這些人群中使用水合氯醛鎮靜後的發生呼吸暫停的風險程度尚未闡明。在這項研究中，通過觀察水合氯醛鎮靜效果、對額外鎮靜藥物的需要量、血氧飽和度下降及需要氧氣支援治療的發生率來研究一歲以下嬰兒因需核磁共振檢查而使用水合氯醛鎮靜的臨床過程。目的是確定足月兒實足年齡和早產兒（<37 周）的孕齡、胎齡與這些因素之間的關係。
方法：這是一項包括 1394 名接受水合氯醛鎮靜行 MRI 檢查的嬰兒中進行的一項回顧性佇列研究。氣管內插管、氣管切開和先天性心臟病的嬰幼兒被排除在外。病歷詳細記錄了 MRI 後 24 小時的變化以確定其中的獨立的危險因素和預後相關參數。單因素和多因素分析用來確定結果變數的危險因素。
結果：術後低血氧飽和度更可能與住院病人（P <0.001）、低體重(3.9 ± 2.1 kg vs 6.6 ± 3.0 kg; P < 0.001)、呼吸暫停病史(33.3% vs 9.9%; P = 0.001)、較高的 ASA 評分（P = 0.002）、更低的實足年齡(58.7 ± 82.8 days vs 152 ± 105.9 days; P < 0.0001)有關。當對早產兒組進行獨立分析後發現，術後低氧飽和度直接與更低的實足年齡(56.0 ± 41.5 days vs 150.6 ± 107.1 days; P = 0.012) 和更低的胎齡(39.5 ± 4.1 weeks vs 54.4 ± 15.2 weeks; P = 0.005)有關，但與孕齡無關。早產兒比足月嬰兒更易發生心動過緩（P = 0.005）。孕周在 48 周以上的早產兒未見明顯的低血氧飽和度。由於早產兒術後低血氧飽和度發生的比例相對較小（8/262 ），無法確切判斷早產兒和足月兒之間發生率的差異。增加水合氯醛的劑量或追加咪達唑侖並沒有增加併發症的發生率。
結論：術後低氧飽和度的發生與足月嬰兒更低的實足年齡和早產兒的更低的孕周有直接關係。住院和具有顯著併發症是兩個足月兒需要長期氧氣支援治療的危險因素。
(丁俊雲 譯， 陳傑 校)

BACKGROUND: Term and preterm infants are at risk of developing apnea after receiving general anesthesia. The risk of apnea after sedation with chloral hydrate (CH) in this population is unknown. In this study, we aimed to describe the clinical course of infants younger than 1 year who received CH for magnetic resonance imaging (MRI), with regard to the efficacy of CH sedation, the need for additional sedative drugs, and the incidence of oxyhemoglobin desaturation or need for oxygen supplementation. We aimed to determine the relationship between these factors to chronological age in term infants and gestational and postconceptional age (PCA) in preterm infants (<37 weeks' gestation).
METHODS: This was a retrospective cohort study of 1394 infants undergoing MRI examination with CH sedation. Infants with an endotracheal tube, tracheostomy tube, or congenital heart disease were excluded. Patient charts were examined in detail to determine independent risk factors and dependent outcome variables up to 24 hours after MRI. Univariate and multivariate analyses were performed to determine risk factors for outcome variables.
RESULTS: Postprocedure oxyhemoglobin desaturation was more likely in inpatients (P < 0.001) and was associated with a lower body weight (3.9 ± 2.1 kg vs 6.6 ± 3.0 kg; P < 0.001), history of apnea (33.3% vs 9.9%; P = 0.001), higher ASA physical status

(P = 0.002), and younger chronological age (58.7 ± 82.8 days vs 152 ± 105.9 days; P < 0.0001). When the preterm group was analyzed separately, the risk of postprocedure oxyhemoglobin desaturation was directly correlated with younger chronological age (56.0 ± 41.5 days vs 150.6 ± 107.1 days; P = 0.012) and younger PCA (39.5 ± 4.1 weeks vs 54.4 ± 15.2 weeks; P = 0.005), but not gestational age. Preterm infants had more postprocedure bradycardia than term infants (P = 0.005). Postprocedural oxyhemoglobin desaturation was not seen in preterm infants older than 48 weeks' PCA. Because of the relatively small percentage of cases (8 of 262) of postprocedural oxyhemoglobin desaturation in preterm infants, we were not able to definitively determine the difference in incidence between preterm and term infants. Additional doses of CH or supplementation with midazolam did not increase the incidence of complications.
CONCLUSIONS: The occurrence of postprocedural oxyhemoglobin desaturation was directly correlated with younger chronological age in term infants and younger PCA in preterm infants. Term infants who required extended oxygen supplementation were inpatients and had significant comorbidities.

每搏心血管指數，CARDEAN：一項前瞻、隨機實驗評估其在結腸鏡檢查時減少體動的功效

A Beat-by-Beat Cardiovascular Index, CARDEAN: A Prospective Randomized Assessment of Its Utility for the Reduction of Movement During Colonoscopy

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背景：作者試圖確定使用每搏心血管指數，CARDEAN，能否減少麻醉下的結腸鏡檢查時病人體動的發生。
方法：監測包括心電圖，脈衝式無創每搏動脈血壓，氧飽和度，腦電雙頻指數（BIS）和 CARDEAN。CARDEAN 由每搏 Finapres®(Ohmeda, Madison, WI)結合一個特定演算法監測心動過速後高血壓的發生確定一個範圍為 0 到 100 的指標。麻醉醫師無法直接接觸 Finapres 和 CARDEAN 系統。調整異丙酚用量以保持 40 <BIS<60。按傳統經驗（心動過速，高血壓及體動）給予阿芬太尼 3.5 μg · kg−1，除非病人的心動過緩/窒息或血氧<95%。159 位在異丙酚麻醉下行結腸鏡檢查的病人隨機分為：（i）對照組：沒有其他干預，或（ii）CARDEAN 組：除了傳統經驗，當 CARDEAN > 60 時觀察者讓麻醉醫生追加阿芬太尼。主要觀察指標是體動的次數。
結果：146 例病人的資料進行了分析（對照組：75; CARDEAN 組：71）。兩組異丙酚和阿芬太尼用量相似。當 BIS<60，CARDEAN 組（3.3 次/100 分[2.3-4.8]）較對照組（6.7 [5.3-8.5]）體動發生較少（相對危險度：0.5 [0.32，0.76]P 值 0.001）。研究中第一個 10 分鐘，CARDEAN 組體動的發生率為 38%，對照

組為 59%（P= 0.04）。
結論：當 BIS<60，無肌松患者行結腸鏡檢查時，使用 CARDEAN 引導阿片類鎮痛藥應用可減少 51%臨床非可預測的體動，更多的研究需要進一步完善以評估 CARDEAN 在各外科手術期間的應用價值。
(張磊 譯，陳傑 校)

BACKGROUND: We sought to determine whether online use of a beat-by-beat cardiovascular index, CARDEAN® (Alpha-2, Lyon, France), modifies the incidence of patient movement during colonoscopy under anesthesia.
METHODS: Monitoring included an electrocardiogram, oscillometric and noninvasive beat-by-beat arterial blood pressure, O2 saturation, bispectral index (BIS), and CARDEAN. CARDEAN consists of beat-by-beat Finapres® (Ohmeda, Madison, WI) combined with an algorithm that detects hypertension followed by tachycardia and produces an index scaled 0 to 100. The anesthesiologist was denied access to Finapres and CARDEAN. Propofol was adjusted to keep 40<BIS<60. Alfentanil 3.5 μg · kg−1 was administered according to conventional signs (tachycardia, hypertension, and movement), unless the patient had signs of brady/apnea or Spo2 <95%. One hundred fifty-nine patients presenting for colonoscopy under propofol anesthesia were prospectively randomized to (i) control: no other intervention, or (ii) CARDEAN: in addition to conventional signs, an observer instructed the anesthesiologist to administer alfentanil when CARDEAN was >60. The primary outcome was the number of observed movements.
RESULTS: Data were analyzed in 146 patients (control: 75; CARDEAN: 71). The doses of propofol and alfentanil were similar in both groups. When BIS was <60, movements were less frequent in the CARDEAN group (3.3 movements/100 min [2.3-4.8]) than in the control group (6.7 [5.3-8.5]) (odds ratio: 0.5 [0.32; 0.76], P = 0.001). During the first 10 minutes of the procedure, the incidence of movements was 38% and 59% in the CARDEAN and control groups, respectively (P = 0.04).
CONCLUSION: With BIS <60, CARDEAN-guided opioid administration is associated with a reduction of 51% of clinically unpredictable movements in unparalyzed patients undergoing colonoscopy. More studies are required to refine the role of CARDEAN in surgical settings.

灌注變異指數（PVI）在預測全麻下行機械通氣狀態下病人呼氣末正壓對血流動力學影響的作用。

The Ability of Pleth Variability Index to Predict the Hemodynamic Effects of Positive End-Expiratory Pressure in Mechanically Ventilated Patients Under General Anesthesia

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背景：灌注變異指數（PVI）是一種新的演算法能通過脈搏血氧儀描計波形的振幅變化來自動持續地監測呼吸變化。PVI 可以無創地監測全麻機械通氣患者的流體反應。作者猜測 PVI 可以預測 10 cm H2O PEEP 對血流動力學的影響。
方法：作者研究了 21 例冠狀動脈旁路移植術後機械通氣和鎮靜的患者。行肺動脈導管和連接到食指的脈搏血氧感測器監測。共記錄連續 3 種潮氣量（6，8 和 10mL/kg）零呼氣末壓力時的血流動力學資料（心指數，PVI，脈壓變異度，中心靜脈壓），然後每種潮氣量增加 10 cm H2O 的 PEEP 並記錄資料。增加 PEEP 後 CI 下降> 15%的患者定義為血液動力學不穩定。
結果： PEEP 可引起潮氣量（Vt）8 與 10 mL/kg 患者的 CI 和 PVI 的變化。血流動力學不穩定 6mL/kgVt 組有 5 例，Vt 8mL/kg 組有 6 例，Vt 10mL/kg 組有 9 例。當 Vt 為 8 mL/kg 時， PVI 閾值設定為 12%，其預測 ZEEP 時血流動力學不穩定的敏感度為 83%，特異度為 80%（受試者特徵曲線區間下面積為 0.806 P 值 0.03）。當 Vt 為 10 mL/kg 時， PVI 閾值為 13%，其預測 ZEEP 時血流動力學不穩定的敏感度為 78%，特異度為 83%（受試者特徵曲線區間下面積 0.829; P 值 0.01）。
結論：鎮靜下機械通氣患者 Vt > 8 mL/kg 時， 可利用 PVI 無創自動地檢測 PEEP 對血流動力學的影響，此方法具有可接受的敏感特異度。
(舒慧剛 譯， 陳傑 校)

BACKGROUND: Pleth variability index (PVI) is a new algorithm allowing automated and continuous monitoring of respiratory variations in the pulse oximetry plethysmographic waveform amplitude. PVI can predict fluid responsiveness noninvasively in mechanically ventilated patients during general anesthesia. We hypothesized that PVI could predict the hemodynamic effects of 10 cm H2O positive end-expiratory pressure (PEEP).
METHODS: We studied 21 mechanically ventilated and sedated patients in the postoperative period after coronary artery bypass grafting. Patients were monitored with a pulmonary artery catheter and a pulse oximeter sensor attached to the index finger. Hemodynamic data (cardiac index [CI], PVI, pulse pressure variation, central venous pressure) were recorded at 3 successive tidal volumes (VT) (6, 8, and 10 mL/kg body weight) during zero end-expiratory pressure (ZEEP) and then after addition of a 10 cm H2O PEEP for each Vt. Hemodynamically unstable patients were defined as those with a >15% decrease in CI after the addition of PEEP.
RESULTS: PEEP induced changes in CI and PVI for Vt of 8 and 10 mL/kg. Hemodynamic instability occurred in 5 patients for a VT of 6 mL/kg, in 6 patients for a VT of 8 mL/kg, and in 9 patients for a VT of 10 mL/kg. For VT of 8 mL/kg, a PVI threshold value of 12% during ZEEP predicted hemodynamic instability with a sensitivity of 83% and a specificity of 80% (area under the receiver operating characteristic curve 0.806; P = 0.03). For VT of 10 mL/kg, a PVI threshold value of 13% during ZEEP predicted hemodynamic instability with a sensitivity of 78% and a specificity of 83% (area under the receiver operating characteristic curve 0.829; P = 0.01).
CONCLUSIONS: PVI may be useful in automatically and noninvasively detecting the hemodynamic effects of PEEP when VT is >8 mL/kg in ventilated and sedated patients with acceptable sensitivity and specificity.

腦功能監測證實的術中知曉病人發生創傷後應激障礙

Posttraumatic Stress Disorder in Aware Patients from the B-Aware Trial

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背景：術中知曉可所造成的長期影響並不一致，一些病人沒有留下長期殘疾，而另一些則導致心理上的問題，且可能是嚴重而持久。 在這項研究中，作者比較了在腦功能監測的隨機試驗中確認或者未確認發生術中知曉的病人，創傷後應激障礙（PTSD）的發生率。
方法：作者使用了一項匹配的佇列設計，旨在匹配 13 例確認術中知曉的患者。對每個存活的知曉患者根據年齡，性別，手術類型，手術日期和醫院配對 4 名對照者。根據對照組配對每一個知曉病人，並使用臨床醫生指導的的創傷後應激量表進行面試。
結果：本研究收集的資料發生在 2006 年 6 月 2007 年 3 月， 平均隨訪年限為 5.3 年（範圍 4.3-5.7 年）。在確診的 13 例知曉病人中 6 例死亡。確診知曉的 7 例中的 5 例（71％）和 25 例對照組中的 3 例（12％）符合創傷後應激障礙（PTSD）（adjusted odds ratio = 13.3 [95％可信區間：1.4-650]; P = 0.02）。這些症狀的中位發病時間為 14 天（範圍：手術後 7-243 天），症狀平均持續時間為 4.7 年（範圍 4.4-5.6 年）。
結論：腦功能監測證實術中知曉的病人，發生創傷後應激障礙是常見且持久的。全身麻醉下發生知曉的防治策略應當修正。
(葉樂 譯，陳傑 校)

BACKGROUND: The long-term consequences of an awareness episode vary. Some patients do not have any long-term disability, whereas others develop psychological problems that may be severe and persistent. In this study, we compared the incidence of posttraumatic stress disorder (PTSD) in patients with and without confirmed awareness who were randomized in the B-Aware Trial.
METHODS: We used a matched cohort design, aiming to follow up the 13 patients with confirmed awareness. Each surviving awareness patient was matched with 4 controls for age, sex, surgery type, date of surgery, and hospital. A face-to-face interview was conducted with each awareness patient and matched controls using the Clinician Administered Posttraumatic Stress Disorder Scale.
RESULTS: Data collection for this study occurred between June 2006 and March 2007, with a median follow-up time of 5.3 yr (range, 4.3–5.7 yr). Six of the 13 confirmed awareness patients had died. Five of the 7 confirmed awareness patients (71%) and 3 of the 25 controls (12%) fulfilled the criteria for PTSD at the time of the interview (adjusted odds ratio = 13.3 [95% confidence interval: 1.4–650]; P = 0.02). The median onset time of symptoms was 14 days (range, 7–243 days) after surgery, and the median duration of symptoms was 4.7 yr (range, 4.4–5.6 yr).
CONCLUSIONS: PTSD was common and persistent in the confirmed awareness patients of the B-Aware Trial. Strategies to prevent awareness in patients under general anesthesia are justified.

妊娠期影像技術

Imaging During Pregnancy
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在過去的 10 年中，影像技術在婦女懷孕期間的使用大大增加。本綜述主要討論超聲、磁共振成像、電腦斷層掃描和X線用於評估非產科疾病的風險和適應證。評估懷孕婦女非產科疾病的顯像診斷正在進展中，並在不斷地變化。現表明產婦放射診斷對胎兒潛在利益的價值大於風險是因為單一的輻射對胎兒風險很小。
(唐穎 譯，陳傑 校)
The use of imaging techniques in women who are pregnant has increased greatly over the past decade. This focused review discusses the risks and indications of ultrasonography, magnetic resonance imaging, computed tomographic scanning, and fluoroscopy for the evaluation of the parturient with non-obstetric disorders. Diagnostic imaging of the pregnant woman for the evaluation of disorders not related to pregnancy is evolving, and protocols will vary from institution to institution. The potential benefit from indicated diagnostic radiological procedures in the parturient nearly always outweighs risk to the fetus because radiation exposure from a single procedure conveys little fetal risk.

動脈內應用尼卡地平和/或米力農治療腦血管痙攣病人的血流動力學管理和預後

Hemodynamic Management and Outcome of Patients Treated for Cerebral Vasospasm with Intraarterial Nicardipine and/or Milrinone

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背景：腦血管痙攣是動脈瘤破裂蛛網膜下腔出血後潛在的致命性併發症。儘管目前臨床上用動脈內尼卡地平或者米力農進行血管內治療，但是對於治療中血流動力學的管理以及預後和管理療效知之甚少。作者測試了兩個假設：（1）動脈內應用尼卡地平和米力農以治療腦血管痙攣可能增加血管收縮藥用量以維持動脈血壓達到靶水準；（2）為了提高血壓而應用大劑量升壓藥可能導致酸中毒以及靶器官（終末器官）缺血性損傷。
方法：收集 2005 年 3 月至 2007 年 7 月期間連續病例進行單中心回顧性研究，這些患者在動脈瘤破裂蛛血後出現腦血管痙攣臨床症狀，且經藥物治療（ “3H 療法” ）無效而接受動脈內尼卡地平和/或米力農注射。
結果：在這 73 例患者（平均年齡 52± 10 歲，其中 50 位女性）所接受的 160 次治療中，96 次僅用尼卡地平治療，5 次僅用米力農，59 次用兩種藥物。93%的病例接受複合肌松的全身麻醉。在治療過程中，維持目標血壓所需要的血管收縮藥的種類及劑量都增加；所需新福林的中位數從 200 μg/min(n = 121)增加至 325 μg/min (n = 122)，去甲腎上腺素從 12 μg/min (n = 60) 增加至 24.5 μg/min (n = 87)，血管加壓素從 7 μg/min 增加至 24 μg/min。然而，治療過程中動脈血壓仍下降了 13%。大於 90%的病例治療後的血管造影照片顯示血管內徑改善。

1 例患者表現出了肌鈣蛋白 T（TnT）的增加，沒有患者出現腎功能減退、腸缺血或外周缺血、系統性酸中毒或急性腦卒中。總體死亡率是 11%。
結論：動脈內應用尼卡地平/米力農治療過程中需要應用血管收縮藥以維持動脈血壓。儘管需要用大劑量的血管收縮藥，這種治療方法具有低死亡率、最小程度的終末器官缺血性損傷及較少系統性酸中毒，且使痙攣腦血管的內徑得以改善。
(鄒巧群 譯，陳傑 校)

BACKGROUND: Vasospasm is a potentially devastating complication after aneurysmal subarachnoid hemorrhage. Although endovascular treatment with intraarterial nicardipine and milrinone is an accepted clinical treatment strategy, there is little information either on hemodynamic management during treatment or on outcome and consequences of the hemodynamic management. We tested 2 hypotheses: (1) intraarterial administration of nicardipine and milrinone to treat cerebral vasospasm would require increased administration of vasoconstrictor to support arterial blood pressure at target levels; and (2) high-dose vasopressors administered to increase blood pressure in these patients would lead to systemic acidosis and end-organ ischemic damage.

METHODS: We conducted a single-center, retrospective review of consecutive patients with clinically symptomatic vasospasm after aneurysmal subarachnoid hemorrhage that failed medical management with “triple H therapy” and subsequently received intraarterial nicardipine and/or milrinone between March 2005 and July 2007.

RESULTS: Of 160 endovascular interventions in 73 patients (aged 52 ± 10 years; 50 women), 96 received only nicardipine, 5 only milrinone, and 59 both drugs. General anesthesia with muscle relaxation was performed for 93% of procedures. During treatment, both the number and dose of vasopressors required to maintain arterial blood pressure at target levels increased; the median dose of phenylephrine increased from 200 (n = 121) to 325 μg/min (n = 122), norepinephrine increased from 12 (n = 60) to 24.5 μg/min (n = 87), and vasopressin infusions increased from 7 to 24. Nonetheless, arterial blood pressure decreased 13% during treatment. In >90% of procedures, the postprocedure angiogram showed improved vessel caliber. A single patient demonstrated troponin T increase; no patients had a decrease in renal function, bowel or peripheral ischemia, systemic acidosis, or acute stroke. Overall mortality was 11%.

CONCLUSIONS: Intraarterial administration of nicardipine and/or milrinone requires use of vasopressors to maintain arterial blood pressure. Despite high doses of vasoconstrictors, treatment has low mortality, minimal end-organ ischemic damage or systemic acidosis, and results in improved caliber of cerebral vessels affected by vasospasm.

嗎啡在脊柱融合術中自體髂骨植骨術供骨區的局部鎮痛作用：一項前瞻性，隨機，雙盲，安慰劑對照的研究

Local Administration of Morphine for Analgesia After Autogenous Anterior or Posterior Iliac Crest Bone Graft Harvest for Spinal Fusion: A Prospective, Randomized, Double-Blind, Placebo-Controlled Study

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背景：一些脊柱融合術中髂骨移植的患者術後供骨區有殘餘痛或慢性疼痛。多種治療措施用來減少有關疼痛，如嗎啡局部注射治療。
方法：作者設計如下一項前瞻性，隨機，雙盲，安慰劑對照研究。針對擇期進行脊柱手術的病人，術中在髂脊骨供區局部注射嗎啡 5mg（治療組）或生理鹽水（安慰劑組）。排除在圍術期大量使用阿片類藥物患者，如每天使用嗎啡大於等於 60mg，或者使用次數大於三次的。術後（恢復室開始並行病人自控鎮痛方法）嗎啡應用標準化。在術後當天和 3、6、12 個月評估供區疼痛指數。
結果：54 例中 47 例（87%）成功隨訪至術後最少 1 年。兩組患者間在年齡、性別、疾病均相似。兩組在圍術期術後 24 小時內使用嗎啡總量無顯著差異（P=0.48）。重複測量的方差分析表明一段時間沒有組相互作用的影響：靜休時臀部疼痛（P=0.94），活動時臀部疼痛（P=0.90），靜休時脊柱疼痛（P=0.99），活動時脊柱疼痛（P=0.83）。兩組術後 1 年隨訪有脊柱疼痛的病人相似（P=0.95）。
結論：研究表明，脊柱融合術中在供區應用嗎啡對術後疼痛緩解無明顯作用。
(楊秋娟 譯，陳傑 校)
BACKGROUND: Harvesting of iliac crest graft for spinal fusions is associated with a number of patients reporting residual or chronic pain at the harvest site. Various interventions, including morphine infiltration, have been proposed to minimize the associated pain.
METHODS: We performed a prospective, double-blind, randomized, placebo-controlled study comparing intraoperative infiltration of 5 mg morphine (treatment) versus saline (placebo) into the iliac crest harvest site for patients undergoing elective spinal surgery. Patients with myelopathy, excessive perioperative opioid use (60 mg equivalent morphine/d or more), or multilevel (>3 levels) spinal surgery were excluded. Postoperative administration of morphine (recovery room and patient-controlled analgesia) was standardized. Numerical pain scores specific for the iliac crest site were determined in the immediate postoperative period and at 3, 6, and 12 months.
RESULTS: Of the 54 patients randomized, 47 (87%) were available for review with a minimum of 1-year follow-up. The groups were similar in baseline age, gender, and comorbidities. There was no significant difference between groups in total use of postoperative morphine during the first 24 hours (P = 0.48). Repeated measures analysis of variance demonstrated no interacting effect of group over time for hip pain at rest (P = 0.94), hip pain while moving (P = 0.90), spine pain at rest (P = 0.99), or spine pain while moving (P = 0.83). The proportion of patients reporting iliac crest pain at 1-year follow-up was the same between groups (P = 0.95).
CONCLUSIONS: This study has demonstrated that there are no additional benefits for the use of intraoperative infiltration of morphine into the iliac crest harvest site during spinal fusions.

遠端腓腸神經和脛後神經的感覺測試能提供早期預測臀肌下股二頭肌旁單次注射坐骨神經阻滯麻醉效果

Sensory Testing of Distal Sural and Posterior Tibial Nerves Provides Early Prediction of Surgical Anesthesia After Single-Injection Infragluteal-Parabiceps Sciatic Nerve Block

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背景：踝關節重建的外科手術麻醉需要坐骨神經所有終末支分佈區域感覺和運動阻滯。在這項前瞻性的研究中，作者研究足部感覺運動試驗對局部麻醉注射後，預測坐骨神經完全阻滯和確定麻醉不完全所需時限是否有價值。
方法：在進行踝關節重建的手術患者（n=180），用‘臀肌下股二頭肌旁’方法進行坐骨神經阻滯，在 <0.4 mA 引出蹠屈或內翻的運動反應後，注射 0.625%左旋布比卡因並混有腎上腺素 1:300,000 (0.4 mL/kg)。由另一位對電刺激運動反應結果不知情的觀察者間隔對腓淺神經、腓深神經、脛後神經、腓腸神經分佈遠端皮膚行針刺感覺評估；運動阻滯效果通過足（蹠屈及背屈）運動和腳趾運動來評估。完善的阻滯定義為在局部麻醉注射的 25 分鐘內坐骨神經分佈的所有區域感覺和運動喪失。感覺運動試驗各節點的最佳敏感特異度是由 ROC 分析決定。使用非參數檢驗法來比較曲線下的面積，截止時間是由敏感度和特異度曲線的交點決定。

結果：坐骨神經阻滯前，87 例患者電刺激運動反應表現為蹠屈而 93 例患者表現為內翻，93 例中的 88 例（94.6%）和 87 例中的 49 例（55.7%）在 25 分鐘內取得完全坐骨神經阻滯。在測試範例中，曲線下的區域是相似。ROC 分析顯示：對於那些電刺激運動反應為內翻者，腓腸神經測試最佳時間為 4 分鐘，脛後神經測試最佳時間為 6 分鐘；而對於那些電刺激運動反應為內翻者，其腓腸神經和脛後神經測試最佳時間均為 6 分鐘。不完全阻滯的受試者沒有一個在 10min 時腓神經麻醉。
結論：從預測坐骨神經阻滯是否成功方面看，4-6 分鐘內出現腓腸神經麻醉（腳跟外側和足外側、第五腳趾）具有與脛後神經和腓總神經分佈區域麻醉或隨後的足部運動反應同樣的價值。此外，未能在 10 分鐘內取得腓腸神經麻醉能預測阻滯失敗。
(劉世文 譯，陳傑 校)

BACKGROUND: Surgical anesthesia for reconstructive ankle surgery requires sensory and motor block of all the terminal nerve distributions of the sciatic nerve. In this prospective observational study, we investigated the value of sensory and motor testing of the foot, after local anesthetic injection, for predicting complete sciatic nerve blockade and the duration of testing required for identifying incomplete anesthesia.
METHODS: Sciatic nerve blocks (n = 180) using the infragluteal-parabiceps approach were performed in patients undergoing reconstructive ankle surgery. Levobupivacaine 0.625% with epinephrine 1:300,000 (0.4 mL/kg) was injected after obtaining an elicited motor response at <0.4 mA of plantar flexion or inversion. Pinprick sensory assessments were performed at intervals by an observer unaware of

the elicited motor response in the distal cutaneous distributions of the superficial peroneal nerve, deep peroneal nerve, posterior tibial nerve, and sural nerve. Motor block was assessed using foot (plantar flexion and dorsiflexion) movement and toe movement. A complete block was defined as sensory and motor loss in all distributions of the sciatic nerve within 25 minutes of local anesthetic injection. The optimal sensitivity and specificity of various cutoff times of sensory and motor testing were determined by receiver operating characteristic analysis. The area under the curves was compared for equivalence using nonparametric methods. The cutoff times were determined as the point of intersection of the lines of sensitivity and specificity.
RESULTS: The elicited evoked motor response before sciatic nerve block was plantar flexion in 87 patients and inversion in 93. Eighty-eight of 93 patients (94.6%) who had an elicited motor response of inversion and 49 of 87 (55.7%) who had an elicited motor response of plantar flexion achieved complete sciatic nerve block at 25 minutes. Area under the curves were not different among testing paradigms. Receiver operating characteristic analysis identified optimal testing times of 4 minutes for the sural and 6 minutes for the posterior tibial nerve with an elicited motor response of inversion and 6 minutes with an elicited motor response of plantar flexion. No subject with an incomplete block achieved sural anesthesia by 10 minutes.
CONCLUSION: Sural anesthesia assessed at the lateral heel and the lateral aspect of the foot and the fifth toe identified within 4 to 6 minutes demonstrated a similar posttest predictive value as anesthesia in the distributions of the posterior tibial and peroneal nerves or motor movement of the foot at later intervals. In addition, failure to achieve sural anesthesia within 10 minutes was predictive of block failure.

使用氨甲環酸後完全不同的暫時性和區域性纖維蛋白酶活性

Temporally and Regionally Disparate Differences in Plasmin Activity by Tranexamic Acid

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背景：心臟手術一個主要的併發症是圍手術期過多、過久的出血。因此通過抑制纖維蛋白溶解來增加凝血功能成為了心臟外科手術患者的一項重要藥物治療，其主要是通過應用氨甲環酸（TXA）等抗纖維蛋白溶解藥物來抑制纖維蛋白酶的活性（PLact）。雖然這一方法幾乎是普遍使用的，但是尚未有人深入研究過由 TXA 所導致的暫時性或區域性纖維蛋白酶活性改變。因此，我們應用螢光基因微量分析系統研究了使用 TXA 後大型動物模型體內纖維蛋白酶活性的動態變化。
方法：將實驗用豬（25-35kg）隨機分為兩組，其中一組 TXA 組（使用 TXA30mg/kg，用生理鹽水稀釋至 50ml；樣本量=9），一組空白對照組（50ml 生理鹽水；樣本量=7）。微量分析探頭被置於肝臟、心肌、腎臟以及四頭肌肌間隔內。微量透析液中含有一種經證實具有纖維蛋白酶特異性的螢光基因肽。當注入 TXA 或空白試劑後，通過微量分析探頭採集初始液體，它能最直接地反映纖維蛋白酶的活性。然後零點基線、30 分鐘、60 分鐘、90 分鐘和 120 分鐘五個測量時點檢測液體螢光值（標準螢光基因單位 SFU）。于同樣的測量時點用同樣的螢光基因方法檢測血漿纖維蛋白酶活性。

結果：與空白對照組相比，TXA 組在 30 分鐘，輸注了超過 110SFU 後血漿纖維蛋白酶活性顯著下降（P<0.05）。肝內的纖維蛋白酶活性在應用 TXA 後的 90 分鐘（>150SFU）和 120 分鐘（>175SFU）也分別特異性的下降了（P<0.05）。肝內纖維蛋白酶活性的下降是在血漿纖維蛋白酶活性降至最低的 60 分鐘以後開始的。與之相反，腎臟、心臟以及四頭肌的纖維蛋白酶活性卻在機體整體活性降低後的 120 分鐘出現暫時性的增強。
結論：通過這個大型動物實驗模型體內微量分析法研究發現，纖維蛋白酶活性改變具有兩面性。一方面，使用 TXA 所致的暫時性纖維蛋白酶活性改變在血漿和機體特定部位是完全不同的。另一方面，使用 TXA 會使得纖維蛋白酶活性發生區域特異性改變。在圍手術期使用纖溶治療時，可能需要在治療方案中考慮到這些應用 TXA 後所產生的暫時性和區域性的不同纖溶效果。
(單嘉琪 譯，薛張綱 校)

BACKGROUND: A major complication associated with cardiac surgery is excessive and prolonged bleeding in the perioperative period. Improving coagulation by inhibiting fibrinolysis, primarily through inhibition of plasmin activity (PLact) with antifibrinolytics such as tranexamic acid (TXA), has been a pharmacological mainstay in cardiac surgical patients. Despite its almost ubiquitous use, the temporal and regional modulation of PLact profiles by TXA remains unexplored. Accordingly, we developed a fluorogenic-microdialysis system to measure in vivo dynamic changes in PLact after TXA administration in a large animal model.
METHODS: Pigs (25-35 kg) were randomly assigned to receive TXA (30 mg/kg, diluted into 50 mL normal saline; n = 9) or vehicle (50 mL normal saline; n = 7). Microdialysis probes were placed in the liver, myocardium, kidney, and quadriceps muscle compartments. The microdialysate infusion contained a validated plasmin-specific fluorogenic peptide. The fluorescence emission (standard fluorogenic units [SFU]) of the interstitial fluid collected from the microdialysis probes, which directly reflects PLact, was determined at steady-state baseline and 30, 60, 90, and 120 min after TXA/vehicle infusion. Plasma PLact was determined at the same time points using the same fluorogenic substrate approach.
RESULTS: TXA reduced plasma PLact at 30 min after infusion by >110 SFU compared with vehicle values (P < 0.05). Specifically, there was a decrease in liver PLact at 90 and 120 min after TXA infusion of >150 SFU (P < 0.05) and 175 SFU (P < 0.05), respectively. The decrease in liver PLact occurred 60 min after the maximal decrease in plasma PLact. In contrast, kidney, heart, and quadriceps PLact transiently increased followed by an overall decrease at 120 min.
CONCLUSIONS: Using a large animal model and in vivo microdialysis measurements of PLact, the unique findings from this study were 2-fold. First, TXA induced temporally distinct PLact profiles within the plasma and selected interstitial compartments. Second, TXA caused region-specific changes in PLact profiles. These temporal and regional differences in the effects of TXA may have important therapeutic considerations when managing fibrinolysis in the perioperative period.

過去50年間新鎮痛藥物的發展：缺乏真正具有突破性的新型藥物

The Development of New Analgesics Over the Past 50 Years: A Lack of Real Breakthrough Drugs.

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1960年至2009年間，共有49種藥物被發現具有鎮痛作用，並且使用至今。其中有7種藥物被認為具有新奇的分子靶位，但是只有舒馬曲坦這一種藥物，有效地激勵了人們努力去發現作用於同一靶點的結構類似的藥物。這一段時間裡，湧現了大量的關於疼痛領域的文章。相較於其他鎮痛藥物，基於嗎啡的疼痛相關文獻占了主導地位。眾多的研究致力於與疼痛機制有關的多種分子靶點，並且已發表了數千篇文獻報導，但是這些研究並非能產生出一種新的鎮痛藥物來改變阿片類藥物和非甾體類抗炎藥所占的份額。嗎啡和阿斯匹林，這兩種一個世紀之前就用於疼痛治療的藥物，儘管在很多方面作用有限（比如神經性疼痛）並且有很多嚴重的不良反應，但是它們仍然在生物醫學文獻中占主導地位。目前的評估顯示，儘管大量研究努力，但是鎮痛藥物的發展仍然缺乏突破。本文討論了關於新的鎮痛藥物研究停滯不前的可能因素。
(黃劍 譯，薛張綱 校)
Fifty-nine drugs identified as analgesics were introduced from 1960 to 2009 and remain in use. Seven can be regarded as having novel molecular targets; however, only one, sumatriptan, was sufficiently effective to motivate the introduction of many similar drugs acting at the same target (triptans). Publication productivity in the area of pain grew exponentially during this period. Pain-related publications on morphine were dominant among other analgesics. Very intensive research efforts directed at diverse molecular targets related to pain mechanisms produced thousands of publications, but those efforts have not yet yielded new analgesics with sufficient effectiveness to change the share of publications on opioids or nonsteroidal antiinflammatory drugs. Morphine and aspirin, introduced for the treatment of pain more than a century ago, continue to dominate biomedical publications despite their limited effectiveness in many areas (e.g., neuropathic pain) and multiple serious adverse effects. The present assessment reveals the lack of real breakthroughs in analgesic drug development despite intense research efforts. Possible factors contributing to the apparent drought of novel analgesics are discussed.

B-Aware 試驗研究雙頻指數監測對長期生存的影響

The Effect of Bispectral Index Monitoring on Long-Term Survival in the B-Aware Trial

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背景：當麻醉使用雙頻指數（BIS）監測時，給予病人的麻醉藥物劑量通常會減少。低劑量的麻醉或許可以避免術中低血壓和器官毒性，但能否降低重病發生率或死亡率仍有爭議。在 B-Aware 實驗中將 2463 名病人隨機的分配在雙頻指數引導麻醉和常規麻醉兩組中。我們對接受 BIS 監測麻醉的病人的死亡、心肌梗死（MI）、中風的發生風險低於接受常規麻醉的病人這一假設進行了試驗。
方法：回顧調查所有手術後 30 天內未死亡患者的病史記錄。記錄死亡和心肌梗死或中風發生的日期和誘因。電話採訪當時所有生存的患者。這項研究的主要終點為生存。

結果：中位隨訪時間為 4.1 年（範圍：0-6.5 年）。548 例（22.2％）病人手術後死亡，220 例（89％）病人發生心肌梗死，115 位（4.7％）病人發生中風。BIS 監測病人和常規麻醉病人的死亡風險並無顯著性差異（風險比為 0.86 [95％可信區間（0.72-1.01）]; P=0.07）。但是，傾向分數分析表明，BIS 監測組中 BIS 值低於 40 的時間超過 5 分鐘的病人的死亡風險相對於組內其他病人為 1.41（95％可信區間為（1.02-1.95），P=0.039），此外，心肌梗死的發生率之比為 1.94（95％可信區間為（1.12-3.35），P 值=0.02），中風的發生率之比為 3.23（95％可信區間為（1.29-8.07），P=0.01）。
結論：進行 BIS 監測並確保 BIS 值低於 40 的時間不超過 5 分鐘可改善患者生存和降低相關發病率。
(李瑩 譯，薛張綱 校)

BACKGROUND: When anesthesia is titrated using bispectral index (BIS) monitoring, patients generally receive lower doses of hypnotic drugs. Intraoperative hypotension and organ toxicity might be avoided if lower doses of anesthetics are administered, but whether this translates into a reduction in serious morbidity or mortality remains controversial. The B-Aware Trial randomly allocated 2463 patients at high risk of awareness to BIS-guided anesthesia or routine care. We tested the hypothesis that the risks of death, myocardial infarction (MI), and stroke would be lower in patients allocated to BIS-guided management than in those allocated to routine care.
METHODS: The medical records of all patients who had not died within 30 days of surgery were reviewed. The date and cause of death and occurrence of MI or stroke were recorded. A telephone interview was then conducted with all surviving patients. The primary end point of the study was survival.
RESULTS: The median follow-up time was 4.1 (range: 0-6.5) years. Five hundred forty-eight patients (22.2%) had died since the index surgery, 220 patients (8.9%) had an MI, and 115 patients (4.7%) had a stroke. The risk of death in BIS patients was not significantly different than in routine care patients (hazard ratio = 0.86 [95% confidence interval {CI}: 0.72-1.01]; P = 0.07). However, propensity score analysis indicated that the hazard ratio for death in patients who recorded BIS values <40 for >5 min compared with other BIS-monitored patients was 1.41 (95% CI: 1.02-1.95; P = 0.039). In addition, the odds ratios for MI in patients who recorded BIS values <40 for >5 min compared with other BIS-monitored patients was 1.94 (95% CI: 1.12-3.35; P = 0.02) and the odds ratio for stroke was 3.23 (95% CI: 1.29-8.07; P = 0.01).
CONCLUSIONS: Monitoring with BIS and absence of BIS values <40 for >5 min were associated with improved survival and reduced morbidity in patients enrolled in the B-Aware Trial.

電阻聚合物與強熱空氣加溫：志願者的熱量傳遞和核心溫度複溫速度比較

Resistive-Polymer Versus Forced-Air Warming: Comparable Efficacy in Orthopedic Patients

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背景：一些不良結局是由圍術期輕度的低體溫造成的。用時下最常用的強熱空氣加溫來保持正常體溫成為麻醉過程中的標準程式。最近發明了一種電阻聚合物患者加溫裝置。我們用前瞻性、隨機的臨床試驗來比較廣泛應用的強熱空氣加熱裝置（Bair Hugger 加熱毯#522 和送風機#750，Arizant，Eden Prairie, MN）和電阻聚合物加熱裝置（Hot Dog 多體位元加熱毯和控制器，Augustine 生物醫學, Eden Prairie, MN）的效能。
方法：八十個將進行矯形外科手術的患者被隨機分入強熱空氣加熱組或電阻聚合物加熱組。連續記錄他們的核心溫度、皮溫（頭部、上臂、前臂、胸部、腹部、背部、大腿、小腿）和房間溫度（整體和靠近病人處）。
結果：在最初的下降之後，兩組的核心溫度上升無統計學差異（強熱空氣組：0.33 度/小時 ± 0.34 度/小時；電阻聚合物組：0.29 度/小時 ± 0.35 度/小時；P 值 =0.6）。在平均皮溫和核心溫度方面也無統計學差異。同電阻聚合物組相比，強熱空氣組能升高病人周圍（外科醫生和麻醉醫生的工作區）的溫度（強熱空氣組：24.4 度± 5.2 度；電阻聚合物組：22.6 度± 1.9 度 30 分鐘處；P 曲線下面積 <0.01）
結論：在行矯形外科手術的患者中，電阻聚合物裝置與強熱空氣裝置的保溫效能是一樣的。
(姚敏敏 譯，薛張綱 校)
BACKGROUND: Several adverse consequences are caused by mild perioperative hypothermia. Maintaining normothermia with patient warming systems, today mostly with forced air (FA), has thus become a standard procedure during anesthesia. Recently, a polymer-based resistive patient warming system was developed. We compared the efficacy of a widely distributed FA system with the resistive-polymer (RP) system in a prospective, randomized clinical study.
METHODS: Eighty patients scheduled for orthopedic surgery were randomized to either FA warming (Bair Hugger warming blanket #522 and blower #750, Arizant, Eden Prairie, MN) or RP warming (Hot Dog Multi-Position Blanket and Hot Dog controller, Augustine Biomedical, Eden Prairie, MN). Core temperature, skin temperature (head, upper and lower arm, chest, abdomen, back, thigh, and calf), and room temperature (general and near the patient) were recorded continuously.
RESULTS: After an initial decrease, core temperatures increased in both groups at comparable rates (FA: 0.33°C/h ± 0.34°C/h; RP: 0.29°C/h ± 0.35°C/h; P = 0.6). There was also no difference in the course of mean skin and mean body (core) temperature. FA warming increased the environment close to the patient (the workplace of anesthesiologists and surgeons) more than RP warming (24.4°C ± 5.2°C for FA vs 22.6 °C ± 1.9°C for RP at 30 minutes; PAUC <0.01).
CONCLUSION: RP warming performed as efficiently as FA warming in patients undergoing orthopedic surgery.

血管加壓素對雙重灌流人胎盤模型中胎兒胎盤血流的多元效應

The Diverse Effects of Vasopressors on the Fetoplacental Circulation of the Dual Perfused Human Placenta

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背景：我們使用雙重灌注，單分離子葉，人胎盤模型來研究 5 種血管加壓素對胎兒動脈灌注壓（FAP）的影響。
方法：在 29 例單獨的實驗中，分別加入腎上腺素（75mg），去甲腎上腺素（75mg），麻黃素（50mg），新福林（2mg）和甲氧胺（40mg）至作為母體血液迴圈的水池中，來決定上述藥物對 FAP 的影響。藥物對每個胎盤子葉的暴露時間約為 180 分鐘。
結果：180 分鐘後，麻黃素組 FAP（mean± sd）由 64 ± 3 mm Hg 上升到 172 ± 71 mm Hg (P < 0.001)，新福林組 FAP 由 81 ± 4 mm Hg 上升到 132 ± 11 mm Hg (P = 0.003)。腎上腺組、去甲腎上腺素組和甲氧胺組 FAP 值沒有變化。
結論：在雙重灌注，單分離子葉，人胎盤模型中，麻黃素和新福林作用於母體循環能引起 FAP 的升高，而腎上腺素、去甲腎上腺素和甲氧胺不會引起 FAP 變化。這些區別的藥效動力學機制還未闡明。因此，這些發現的臨床意義尚不明朗。
(俞佳 譯，薛張綱 校)

BACKGROUND: We studied the effects of 5 vasopressors on fetal arterial perfusion pressure (FAP) in vitro using the dual perfused, single isolated cotyledon, human placental model.
METHODS: In 29 separate experiments, epinephrine (75 mg), norepinephrine (75 mg), ephedrine (50 mg), phenylephrine (2 mg), and methoxamine (40 mg) were introduced into the 250-mL reservoir serving the maternal perfusion circuit to determine the effect of each drug on FAP. The duration of drug exposure for each placental cotyledon was approximately 180 minutes.
RESULTS: After 180 minutes, FAP (mean ± sd) increased significantly with ephedrine from 64 ± 3 to 172 ± 71 mm Hg (P < 0.001) and with phenylephrine from 81 ± 4 to 132 ± 11 mm Hg (P = 0.003). No changes in FAP were seen with epinephrine, norepinephrine, and methoxamine.
CONCLUSIONS: In the dual perfused, single isolated cotyledon, human placental model, exposure of the maternal circulation to ephedrine and phenylephrine caused an increase in FAP, whereas exposure to norepinephrine, epinephrine, and methoxamine did not. The pharmacodynamic mechanisms underlying these differences have yet to be explained. Thus, the clinical implications of the findings are as yet unclear.

磷酸二酯酶抑制劑奧普力農在全腦缺血中的作用

The Effects of the Phosphodiesterase Inhibitor Olprinone on Global Cerebral Ischemia

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背景：磷酸二酯酶抑制劑奧普力農三號已被證實能改善心肌功能並增加腦血流量；因此，如果奧普力農對全腦缺血的直接神經保護作用與西洛他唑的程度相

同的話，那麼奧普力農可能對心跳驟停後的腦復蘇有用。我們分別從體內體外兩條途徑試驗了奧普力農是否在全腦缺血時對神經細胞有保護作用。

方法：在一個通過阻塞四條血管誘發的十分鐘全腦缺血的老鼠模型上，於 40 分鐘的圍缺血期內注射 0.3, 3, 或者 30 μg · kg−1 · min−1 的奧普力農或生理鹽水（每組 6 個）。再灌注後的三天裡清點海馬 CA1 區神經細胞數量，收集再灌注後 15 分鐘的標本用 Western 印跡法分析環磷酸腺苷磷酸 3'5' -磷酸腺苷反應元件結合蛋白的磷酸化程度。在體外，培養的腦神經元暴露在低氧和乏糖環境下 4 小時，然後在 24 小時的復蘇期內使用(10−11–10−5 mol · L−1)或不用奧普力農。細胞活性測定使用細胞計數試劑盒- 8（Dojindo 分子技術，馬里蘭州蓋瑟斯堡）。

結果：在老鼠全腦缺血模型中，存活的 CA1 神經元數量在一個顯微鏡視野裡計數，30 μg · kg−1 · min−1 組(49.9 ± 9.2)明顯高於生理鹽水注射對照組(7.2 ± 3.4), 且奧普力農治療增加了環磷酸腺苷磷酸 3'5' -磷酸腺苷反應元件結合蛋白的磷酸化。在劑量依賴規則下有奧普力農環境中培養的神經細胞的存活分數要顯著高於沒有奧普力農環境下培養出來的神經細胞。

結論：本研究第一次成功地證明了奧普力農在體內和體外都有神經細胞保護作用，尤其是在抗全腦缺血時。這些結果提示奧普力農可能對經歷全腦缺血的病人有治療作用。

(張玥琪 譯，薛張綱 校)

BACKGROUND: The phosphodiesterase III inhibitor olprinone has been confirmed to improve myocardial function and increase cerebral blood flow; therefore, if olprinone exerts direct neuroprotective effects against global cerebral ischemia to the same degree as cilostazol, olprinone could be useful for cerebral resuscitation after cardiac arrest. We examined whether olprinone directly protected neuronal cells from global cerebral ischemia both in vivo and in vitro.

METHODS: In a rat model of 10-minute global cerebral ischemia induced by 4-vessel occlusion, 0.3, 3, or 30 μg · kg^{-1} · min^{-1} olprinone or saline was infused for a periischemic period of 40 minutes (*n* = 6 for each group). Hippocampal CA1 neuronal cells were then counted 3 days after reperfusion, and the phosphorylation of cyclic adenosine 3 ´ 5 ´ -monophosphate response element-binding protein was examined using Western blotting analyses of specimens obtained 15 minutes after reperfusion. In vitro, cultured cerebral neurons were exposed to 4 hours of hypoxia and glucose deprivation and then 24 hours of recovery in the absence or presence of olprinone (10^{-11}–10^{-5} mol · L^{-1}). Cell viability was measured using the Cell Counting Kit-8 (Dojindo Molecular Technologies, Gaithersburg, MD).

RESULTS: In the rat model of global ischemia, the number of surviving CA1 neurons counted under a microscopic field in the 30 μg · kg^{-1} · min^{-1} olprinone-treated group (49.9 ± 9.2) was significantly higher than that in the saline infusion control group (7.2 ± 3.4), and olprinone treatment increased the phosphorylation of cyclic adenosine 3 ´ 5 ´ -monophosphate response element-binding protein. The survival fraction of the neuronal cells cultured in the presence of olprinone was also significantly higher than that of cells cultured in the absence of olprinone in a dose-dependent manner.

CONCLUSIONS: Our study successfully demonstrated, for the first time, that olprinone had a protective effect on neuronal cells in vitro and in vivo, especially against global cerebral ischemia. These results suggest that olprinone might be useful

for the treatment of patients experiencing global cerebral ischemia.

局部壓力如何反映疼痛部位？一項關於頸椎關節突關節疼痛的研究

What does local tenderness say about the origin of pain? An investigation of cervical zygapophysial joint pain.

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背景：不管使用觸診法還是計量痛壓計，每個疼痛患者都需進行機械性痛覺靈敏度測驗。儘管該評估方法已被廣泛應用，但是至今沒有機械性痛覺靈敏度測驗對於疼痛定位相關意義的研究報導。我們測試了通過進行機械性痛覺靈敏度測驗來辨別頸椎關節突出導致的疼痛的臨床假設。
方法：共有 33 例慢性單側頸部疼痛的患者納入該項研究。測定雙側頸椎關節突關節的壓痛閾值（Pressure pain thresholds ，PPTs)。使用選擇性神經阻滯法確診頸椎關節突關節疼痛。初步比較所有患者有症狀側和無症狀側關節突關節的 PPTs 值的差異。進一步比較存在關節突關節疼痛的患者中有症狀側和無症狀側的關節 PPT 值差異，比較有關節突關節疼痛患者和無關節突關節疼痛患者疼痛側的 PPT 差異。PPT 對於兩種不同截值的敏感性和特異性(痛側和對側 PPT 存在差異界定為 1kPa 和 30kPa；即：試驗結果陽性，則痛側與對側 PPT 的差異至少分別為 1kPa 和 30kPa，否則試驗結果為陰性)。
結果：患有關節突關節疼痛的患者共 14 例。這些病例中，初步分析痛側 PPT 與對側 PPT 均值差異為-6.2 kPa (95% 置信區間: -19.5 to 7.2, P = 0.34)。此外進一步分析並未產生有統計學意義結果。截值 1kPa 的敏感性和特異性分別為 67%和 16%，陽性似然比 0.79，診斷置信度為 38%。而截值 30kPa 的敏感性下降為 13％，但特異性升至 95%，陽性似然比 2.53，診斷置信度為 67%。有關節突關節患者的 PPT 值明顯低於無痛患者（P < 0.001）。
結論：機械性疼痛靈敏度的評估尚不能診斷頸椎關節突關節的疼痛。但此項結果將有助於促進更多在臨床廣泛使用的對於疼痛患者的臨床診斷工具的研究。(張釗 譯，薛張綱 校)
BACKGROUND: Mechanical pain sensitivity is assessed in every patient with pain, either by palpation or by quantitative pressure algometry. Despite widespread use, no studies have formally addressed the usefulness of this practice for the identification of the source of pain. We tested the hypothesis that assessing mechanical pain sensitivity distinguishes damaged from healthy cervical zygapophysial (facet) joints.
METHODS: Thirty-three patients with chronic unilateral neck pain were studied. Pressure pain thresholds (PPTs) were assessed bilaterally at all cervical zygapophysial joints. The diagnosis of zygapophysial joint pain was made by selective nerve blocks. Primary analysis was the comparison of the PPT between symptomatic and contralateral asymptomatic joints. The secondary end points were as follows: differences in PPT between affected and asymptomatic joints of the same side of patients with zygapophysial joint pain; differences in PPT at the painful side between patients with and without zygapophysial joint pain; and sensitivity and specificity of PPT for 2 different cutoffs (difference in PPT between affected and contralateral side by 1 and 30 kPa, meaning that the test was considered positive if the difference in PPT between painful and contralateral side was negative by at least 1 and 30 kPa,

respectively). The PPT of patients was also compared with the PPT of 12 pain-free subjects.
RESULTS: Zygapophysial joint pain was present in 14 patients. In these cases, the difference in mean PPT between affected and contralateral side (primary analysis) was -6.2 kPa (95% confidence interval: -19.5 to 7.2, P = 0.34). In addition, the secondary analyses yielded no statistically significant differences. For the cutoff of 1 kPa, sensitivity and specificity of PPT were 67% and 16%, respectively, resulting in a positive likelihood ratio of 0.79 and a diagnostic confidence of 38%. When the cutoff of 30 kPa was considered, the sensitivity decreased to only 13%, whereas the specificity increased to 95%, resulting in a positive likelihood ratio of 2.53 and a diagnostic confidence of 67%. The PPT was significantly lower in patients than in pain-free subjects (P < 0.001).
CONCLUSIONS: Assessing mechanical pain sensitivity is not diagnostic for cervical zygapophysial joint pain. The finding should stimulate further research into a diagnostic tool that is widely used in the clinical examination of patients with pain.

疼痛機制：N-安替比林-3，4-二葉綠素馬來醯亞胺，一種有效治療慢性疼痛的環醯亞胺：谷氨酸能系統的作用

PAIN MECHANISMS: *N*-Antipyrine-3, 4-Dichloromaleimide, an Effective Cyclic Imide for the Treatment of Chronic Pain: The Role of the Glutamatergic System

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背景：近些年，環醯亞胺因其可能的治療潛能吸引了科學界的注意。關於複合物 NA-3,4-DCM 的研究也證明了其在福馬林和辣椒城傷害模型中的抗傷害效果，以及減少小鼠醋酸誘導的腹部扭動。
方法：本實驗中，我們檢測了 NA-3,4-DCM 對小鼠持續性疼痛樣行為模型中機械性超強傷害的影響。我們也觀察了 NA-3,4-DCM 在外周、表皮、脊髓和脊髓上水準的抗傷害特性，並評估谷氨酸能系統在 NA-3,4-DCM 抗傷害效應中的作用。
結果：NA-3,4-DCM 全身使用（腹腔內給藥或口服）能干擾小鼠蹠肌內注射角叉藻聚糖和完全弗羅因德佐劑誘導的機械性超強傷害的發生。有趣的是，重複腹腔內給藥或口服 NA-3,4-DCM 不僅減輕強傷害性刺激，也逆轉注射完全弗羅因德佐劑或局部結紮坐骨神經的機械性致敏作用，且給藥劑量較加巴噴丁——臨床上用於治療慢性疼痛的藥物——更低。全身、表皮、脊髓和脊髓上給予 NA-3,4-DCM 都能抑制福馬林試驗兩個階段中明顯的傷害性感受。全身給予 NA-3,4-DCM 還能減輕小鼠蹠間或鞘內注射谷氨酸誘導的傷害性感受。此外，NA-3,4-DCM 能明顯抑制鞘內注射 I 類親代謝性谷氨酸鹽受體激動劑(1S,3R)- 氨基酸環戊烷-反式-1,3-dicardboxylic 酸 (ACPD)或 *N*- 甲基-d- 天冬氨酸(NMDA)誘導的傷害性反應，而不干擾其他非 NMDA 受體激動劑（α-氨基酸-3-羥-5-甲基-4-異噁唑丙酸和紅藻氨酸鹽）或 P 物質誘導的傷害性感受。值得注意的是，在

相同劑量範圍內複合物 NA-3,4-DCM 產生的抗傷害效應與非特異性效應如活動能力和運動協調能力的改變無關。
結論：這些結果強烈證明在小鼠外周、脊髓和脊髓上位置 NA-3,4-DCM 都能發揮抗超強傷害性感受的作用，並且 NA-3,4-DCM 與 I 類親代謝性谷氨酸鹽受體和 NMDA 受體的相互反應參與其作用機制。
(朱蘭芳 譯，薛張綱 校)

BACKGROUND: In recent years, cyclic imides have attracted the attention of the scientific community because of their promising therapeutic potential. Studies with the compound *N*-antipyrine-3,4-dichloromaleimide (NA-3,4-DCM) also demonstrated an antinociceptive effect in formalin or capsaicin models of nociception, and that it reduced acetic acid–induced abdominal writhing in mice.
METHODS: In this study, we examined the effects of NA-3,4-DCM on mechanical hypernociception in persistent pain-like behavioral models in mice. We also investigated the peripheral, topical, spinal, and supraspinal antinociceptive properties of NA-3,4-DCM and evaluated the involvement of the glutamatergic system on the antinociceptive effects of NA-3,4-DCM in mice.
RESULTS: NA-3,4-DCM, dosed systemically (intraperitoneally or per os), was capable of interfering with the development of mechanical hypernociception induced by intraplantar injection of carrageenan and complete Freund adjuvant in mice. Interestingly, repeated intraperitoneal or per os treatment with NA-3,4-DCM, administered after the induction of hypernociception, also reversed the mechanical sensitization induced by complete Freund adjuvant injection or partial ligation of the sciatic nerve in mice, with lower doses than gabapentin, a drug used clinically to treat chronic pain. When administered systemically, locally, spinally, or supraspinally, NA-3,4-DCM was able to inhibit the overt nociception of both phases of the formalin test. The systemic administration of NA-3,4-DCM also reduced the nociception induced by intraplantar or intrathecal injection of glutamate in mice. Furthermore, NA-3,4-DCM caused marked inhibition of the nociceptive response induced by intrathecal injection of a group I metabotropic glutamate receptors agonist (1S,3R)-aminoyclopentane-trans-1,3-dicardboxylic acid (ACPD) or *N*-methyl-d-aspartate (NMDA), without interfering with nociception induced by other non-NMDA receptor agonists (α-amino-3-hydroxyl-5-methyl-4-isoxazole-propionic acid and kainate) or by substance P. Notably, in the same range of doses, the antinociception caused by the compound NA-3,4-DCM was not associated with nonspecific effects such as changes in locomotor activity or motor coordination.
CONCLUSION: These results provide strong evidence that NA-3,4-DCM produces antihypernociception in mice at peripheral, spinal, and supraspinal sites, and that interaction with the group I metabotropic glutamate receptors and NMDA receptors contributes to the mechanisms underlying its effect.

通過超聲引導研究頸深叢及頸交感幹神經阻滯的解剖學基礎

An Anatomical Basis for Blocking of the Deep Cervical Plexus and Cervical Sympathetic Tract Using an Ultrasound-Guided Technique

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背景：選擇性阻滯頸叢和頸交感幹的方法尚沒有建立。
方法：我們仔細研究了 28 具屍體的頸部解剖。並且在兩名健康志願者身上注射局麻藥，並通過電腦斷層掃描技術觀察局麻藥的分佈情況。
結果：頸深叢位於頭長肌和斜角肌的肌間溝內。頸交感幹位於位於頭長肌的前內側表面。儘管局麻藥注射入長頭肌後藥物局限在肌肉內，但是它也可以擴散到臨近的 C2 至 C5 神經根及交感神經幹。
結論：長頭肌是阻滯頸叢和交感幹的合適的標誌物。
(陳珺珺 譯，薛張綱 校)
BACKGROUND: A selective blocking method for the cervical plexus and the cervical sympathetic trunk has not yet been established.
METHODS: We performed a detailed examination of the neck anatomy using 28 cadavers. The pattern of local anesthetic distribution after injection in 2 healthy volunteers was imaged using computed tomographic scan.
RESULTS: The deep cervical plexus was located in the groove between the longus capitis and scalenus medius muscles. The cervical sympathetic trunk was located on the anteromedial surface of the longus capitis. Although anesthetic injected into the longus capitis was confined to the muscle, it infiltrated into neighboring structures including the C2 to C5 roots and sympathetic trunk.
CONCLUSIONS: The longus capitis muscle is a suitable landmark for blocking the cervical plexus and trunk.