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簡報：心臟手術病人應用抗血小板因數 4/肝素免疫分析高劑量肝素確診試驗的診斷價值

Brief Report: The Diagnostic Value of the Anti-PF4/Heparin Immunoassay High-Dose Heparin Confirmatory Test in Cardiac Surgery Patients

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現有關於驗證使用高劑量肝素會改善抗血小板因數 4/肝素酶免疫分析對肝素誘導的血小板減少症（HIT）診斷特異性的資料有限且存在爭議。作者調查了來自最近發表的一項關於心臟手術病人研究的血清，發現在肝素誘導的血小板啓動試驗陽性的血清中只有一半是能夠在酶免疫分析中被高劑量的肝素（100 IU/mL）抑制（吸收度<40%）。更重要的是，伴有明確 HIT 的 3 個病人中只有 2 個是確診試驗陽性。因此，高劑量肝素確診試驗的應用需注意排除血小板啓動的抗血小板因數 4/肝素抗體或者臨床 HIT。
（孫曉瓊　譯　陳傑　校）

There are limited and conflicting data on how a confirmatory step using high-dose heparin can improve diagnostic specificity of the antiplatelet factor 4/heparin enzyme immunoassay for heparin-induced thrombocytopenia (HIT). We investigated sera from a recently published study on cardiac surgery patients and found that only half of the sera that were heparin-induced platelet activation assay positive could be inhibited (optical

density <40%) by high-dose heparin (100 IU/mL) in the enzyme immunoassay. More importantly, only 2 of the 3 patients with definite HIT were confirmatory test positive. Therefore, the high-dose heparin confirmatory test should be used with caution to exclude platelet-activating antiplatelet factor 4/heparin antibodies or clinical HIT.

阿瑞匹坦聯合地塞米松與昂丹司瓊聯合地塞米松在預防開顱術後病人噁心嘔吐的比較

A Comparison of the Combination of Aprepitant and Dexamethasone Versus the Combination of Ondansetron and Dexamethasone for the Prevention of Postoperative Nausea and Vomiting in Patients Undergoing Craniotomy

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Anesth Analg April 2011 112:813-818

背景： 開顱術後常常出現噁心嘔吐。預防性應用昂丹司瓊和地塞米松的患者，術後 48 小時嘔吐發生率爲 45%。除了會引起患者身體上的不適以外，嘔吐的生理反應可能會增加顱內壓或腦血管壓，危及生理止血和腦灌注。阿瑞匹坦是長效的神經激肽 1 受體拮抗劑且無鎮靜的副作用。一項在接受腹部手術病人中進行的大型多中心研究中，預防性應用阿瑞匹坦比昂丹司瓊能更有效地預防術後 24 小時和 48 小時嘔吐發生。作者假設，與昂丹司瓊聯合地塞米松相比，阿瑞匹坦聯合地塞米松將降低全麻開顱手術病人術後嘔吐的發生率。
方法：此項前瞻性、雙盲、隨機化的研究納入物件爲行全麻開顱手術病人。病人被隨機分爲兩組：分別在麻醉誘導前 1-3 小時口服阿瑞匹坦 40mg（或安慰劑），或手術結束 30 分鐘內靜脈注射 4mg 昂丹司瓊（或安慰劑）。所有病人在麻醉誘導後給予地塞米松 10mg。施行標準化麻醉。術後 48 小時內由不知情人員定期收集資料。應用 Welcoxon 秩和核對總和 χ^2 檢驗進行統計分析。若 $P < 0.05$ 則認爲有統計學意義。
結果：104 名患者完成了此項研究。阿瑞匹坦組的 48 h 嘔吐累積發生率爲 16%，而昂丹司瓊組爲 38%（$P = 0.0149$）。且阿瑞匹坦組的 2h 和 24h 嘔吐發生率也相應的比昂丹司瓊組低，分別爲 6%對 21%, $P = 0.0419$ 和 14% 對 36%, $P = 0.0124$。0 至 48h 中，兩組在噁心發生率(69% 對 60%)、評分、搶救性止吐藥需求率(65% 對 60%)、完全有效率（無 PONV，無搶救，22%對 36%）、PONV 管理的病人滿意度方面並無明顯差異。
結論：阿瑞匹坦聯合地塞米松較昂丹司瓊聯合地塞米松能更有效地預防全麻開顱手術成人的術後嘔吐。而噁心發生率、嚴重度、止吐藥需求或者完全有效方面組間並無差異。
（孫曉瓊　譯　陳傑　校）
BACKGROUND: Postoperative nausea and vomiting (PONV) occur commonly after craniotomy. In patients receiving prophylaxis with ondansetron and dexamethasone, vomiting occurred in 45% of patients at 48 hours. In addition to causing patient discomfort, the physical act of vomiting may increase intracranial pressure or cerebral intravascular pressure, jeopardizing hemostasis and cerebral perfusion. Aprepitant is a

neurokin-1 receptor antagonist with a long duration of action and no sedative side effect. In a large multicenter study in patients undergoing abdominal surgery, aprepitant was significantly more effective than was ondansetron in preventing vomiting at 24 and 48 hours postoperatively. We hypothesized that the combination of aprepitant with dexamethasone will decrease the incidence of postoperative vomiting when compared with the combination of ondansetron and dexamethasone in patients undergoing craniotomy under general anesthesia.
METHODS: Patients scheduled to undergo craniotomy under general anesthesia were enrolled in this prospective, double-blind, randomized study. Patients were randomized to receive oral aprepitant 40 mg (or matching placebo) 1 to 3 hours before induction of anesthesia or ondansetron 4 mg IV (or placebo) within 30 minutes of the end of surgery. All patients received dexamethasone 10 mg after induction of anesthesia. The anesthetic technique was standardized. Data were collected at regular intervals by blinded personnel for 48 hours after surgery. Statistical analysis was performed using Wilcoxon's ranked sum test and χ^2 test. $P < 0.05$ was considered statistically significant.
RESULTS: One hundred four patients completed the study. The cumulative incidence of vomiting at 48 hours was 16% in the aprepitant group and 38% in the ondansetron group ($P = 0.0149$). The incidence of vomiting was also decreased in the aprepitant group at 2 hours (6% vs. 21%, $P = 0.0419$) and 24 hours (14% vs. 36%, $P = 0.0124$). From 0 to 48 hours, there was no difference between the aprepitant and ondansetron groups in the incidence of nausea (69% vs. 60%), nausea scores, need for rescue antiemetics (65% vs. 60%), complete response (no PONV and no rescue, 22% vs. 36%), or patient satisfaction with the management of PONV.
CONCLUSION: The combination of aprepitant and dexamethasone was more effective than was the combination of ondansetron and dexamethasone for prophylaxis against postoperative vomiting in adult patients undergoing craniotomy under general anesthesia. However, there was no difference between the groups in the incidence or severity of nausea, need for rescue antiemetics, or in complete response between the groups.

脊柱手術患者血紅蛋白的三種監測方法的比較

A Comparison of Three Methods of Hemoglobin Monitoring in Patients Undergoing Spine Surgery

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背景：血紅蛋白含量可方便地判斷是否需要術中輸血。目前血紅蛋白有兩種有創檢測方法，一種是實驗室的碳氧血氧儀法（tHb），另一種是可即時檢測的HemoCue 法（HCue)。目前一種新型無創連續的光譜感測器（Masimo SpHb）開始在臨床應用。本文比較了 SpHb 相對 tHb，Hcue 相對 tHb 在測定上的準確度。
方法：20 名年齡 40 至 80 歲的患者參與本研究。均爲俯臥位接受全麻下脊柱手術，通過橈動脈置管獲得血液樣本。分別在麻醉誘導後手術開始前及手術開始後的

每一個小時測定 SpHb, tHb 和 Hcue。以兩種方法測定的結果差值（SpHb – tHb，HCue − tHb）作爲主要結果。每位患者均用每種方法採集 3-5 個樣本。採用多種技術分析差值和絕對差值來評估每種血紅蛋白測定方法的準確性。同時研究差值與總血紅蛋白水準，手術時間，年齡，體征和灌注指數等變數的關係。

結果： 應用 SpHb, tHb 和 Hcue 三種方法共採集了 20 位元患者 78 個樣本。其中，SpHb 與 tHb 進行比較的結果顯示， 61%樣本量的絕對差值小於 1.5 g/dL， 16%的絕對差值在 1.6 到 2.0 g/dL 之間， 22%的絕對差值大於 2.0 g/dL。同時發現差值隨時間和灌注指數增高呈明顯下降態勢，年齡、體重與差值沒有系統相關性。除一例結果外， Hcue 與 tHb 的絕對差值小於 1.0g/dL。

結論：儘管 Hcue 法在測定血紅蛋白中保持了一貫的準確性，資料顯示 SpHb 在多數情況下與總血紅蛋白含量仍有相關性。此研究還提示了在一些患者中，SpHb 可能達不到某些臨床需要的準確度。改善持續無創檢測技術如 SpHb 的精確性以期能滿足臨床需要。

（陸秉瑋　譯　陳傑　校）

BACKGROUND: Hemoglobin values (Hb) can facilitate decisions regarding perioperative transfusion management. Currently, Hb can be determined invasively by analyzing blood via laboratory Co–Oximetry (tHb) or by point-of-care HemoCue (HCue). Recently, a new noninvasive, continuous spectrophotometric sensor (Masimo SpHb) was introduced into clinical practice. We compared the accuracy of the SpHb and HCue with tHb.

METHODS: Twenty patients, ages 40 to 80 years, were studied. They received general anesthesia and underwent spine surgery in the prone position. All blood samples were obtained from a radial artery catheter. SpHb, tHb, and HCue were determined immediately after induction of anesthesia, but before the start of surgery and approximately every hour thereafter. Primary outcomes were defined on the basis of the following differences between measures: SpHb − tHb or HCue − tHb. All patients had 3 to 5 observations taken on each measure. Differences and absolute differences were analyzed by several techniques to assess accuracy. We also investigated the relationship between observed differences and the following variables: tHb level, duration of surgery, age, weight, and perfusion index.

RESULTS: Data consisted of 78 measurements of SpHb, tHb, and HCue made on the 20 patients. Absolute differences between SpHb and tHb were <1.5 g/dL for 61% of observations, between 1.6 to 2.0 g/dL for 16% and >2.0 g/dL for 22% of the observations. Observed differences displayed significant decreases with time and higher perfusion index values. No systematic relationships were observed with age or weight. Except for 1 value, all of the HCue values were <1.0 g/dL of tHb.

CONCLUSIONS: Although HCue was consistently accurate, our data confirm that SpHb often correlated well with tHb values. Yet our study indicates that SpHb may not be as accurate as clinically necessary in some patients. Improved refinement of continuous, noninvasive technology, such as SpHb, could address important clinical requirements.

可視喉鏡（Airway Scope）在側臥位氣管插管中的應用

Airway Scope for Tracheal Intubation in the Lateral Position

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背景：因爲側臥位時直接喉鏡暴露的視野條件不佳，此時氣管插管就很困難。Airway Scope 可以在直接喉鏡視野暴露較差的情況下，在側臥位時，使插管更便利。爲此作者比較了仰臥位與左或右側臥位的手術病人運用 Airway Scope 後的插管效率。
方法：成年患者在接受麻醉隨機分爲三組：仰臥位組，左側臥位組，右側臥位組（每組 43 人，n=43）.指定體位放置後採用 Macintosh 喉鏡暴露喉部視野，採用 Airway Scope 進行氣管插管。同時驗證在此條件下，左或右側臥位的插管時間較仰臥位增加不超過 10 秒的假說。
結果：2 組側臥位的插管成功率均爲 100%，仰臥位的成功率爲 98%。三組插管時間相近，左側臥位爲 24±5 秒，右側爲 24±6 秒，仰臥位爲 22±7 秒。插管次數在兩組側臥位以及仰臥位和左側臥位間相似。但仰臥位插管次數較右側臥位多（p=0.004）。三組的氣道併發症發生率相近。沒有發生低氧，牙齒損傷以及食道插管。改良 Cormack – Lehane 評分和使用 Macintosh 喉鏡時聲門暴露評分在側臥位組中沒有差異，但仰臥位的評分高於任意一組側臥位（p 均<0.001）。
結論：儘管左或右側臥位喉鏡暴露的視野都比仰臥位的病人差，採用 Airway Scope 的插管依然有較高的成功率。另外，採用 Airway Scope 後左或右側臥位的插管時間較仰臥位增加均不超過 10 秒。因此，Airway Scope 在側臥位的氣管插管時可能是一個有用的工具。
（陸秉瑋　譯　陳傑　校）

BACKGROUND: Tracheal intubation in the lateral position is difficult because the laryngeal view is compromised during direct laryngoscopy. The Airway Scope facilitates intubation even when laryngeal views are poor with direct laryngoscopy, as they often are in the lateral position. We thus compared the efficacy of the Airway Scope in supine patients with those in the left- and right-lateral positions.
METHODS: Anesthetized adults were randomly assigned to supine, left-lateral, or right-lateral position (*n* = 43 for each group). Laryngeal views were obtained in the designated position with a Macintosh laryngoscope, and patients' tracheas were subsequently intubated with the Airway Scope. Specifically, we tested the hypothesis that the time required for intubation in the left- and right-lateral positions is not increased by >10 seconds compared with tracheal intubation in the supine position.
RESULTS: Overall intubation success was 100% in the 2 lateral positions, and 98% in the supine position. Intubation times were similar in the left-lateral (24 [5] seconds, mean [SD]), right-lateral (24 [6] seconds), and supine (22 [7] seconds) positions. The numbers of required intubation attempts were similar in the 2 lateral positions and in the supine and left-lateral positions. However, more intubation attempts were required in the supine

position than in the right-lateral position ($P = 0.004$). The incidences of airway complications were similar in each position; no hypoxia, dental injury, or esophageal intubation was observed. Modified Cormack-Lehane and the percentage of glottic opening scores obtained with the Macintosh laryngoscope did not differ between the 2 lateral positions, but the modified Cormack-Lehane and percentage of glottic opening scores were superior in the supine position (all $P < 0.001$) compared with either of the lateral positions.

CONCLUSIONS: Despite worse laryngoscopic views in either lateral position than when patients were supine, intubation with the Airway Scope offered high success rates. Furthermore, intubation time using the Airway Scope in either lateral position was not longer by >10 seconds than in the supine position. The Airway Scope thus seems to be a useful tool when tracheal intubation is required in a laterally positioned patient.

高危病人行非心臟手術後死亡的早期決定因素是多器官功能衰竭

Early Determinants of Death Due to Multiple Organ Failure After Noncardiac Surgery in High-Risk Patients

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背景：在非心臟手術病人管理方面，預測圍術期心臟併發症是非常重要的。這些病人通常死于膿毒症所導致的原發性或繼發性器官功能衰竭（MOF）。本文研究手術病人院內 MOF 所致死亡的早期圍術期危險因素。

方法：此項前瞻性、多中心、觀察性佇列研究，共有 21 個巴西重症監護室（ICU）參與。研究物件爲行非心臟手術後 24 小時內轉入 ICU 的病人。多器官功能衰竭的定義是至少有兩個器官功能衰竭。用 Logistic 回歸的多因素分析方法評估 MOF 所致的院內死亡的相對風險。

結果：共有 587 個病人入選（平均年齡：62.4±17 歲）。ICU 和院內病死率分別爲 15%和 20.6%。死亡的主要原因爲 MOF（53%）。入院時存在的腹膜炎(相對風險 4.17, 95% 可信區間 1.38–12.6)、糖尿病(相對風險 3.63, 95%可信區間 1.17–11.2)、急診手術(相對風險 3.62, 95%可信區間 1.18–11.0)、高齡(相對風險 1.04, 95%可信區間 1 0.01–1.08)、乳酸升高 (相對風險 1.52, 95%可信區間 1.14–2.02)、中心靜脈壓升高 (相對風險 1.12, 95%可信區間 1.04–1.22)、心率加快 (相對風險 3.63, 95%可信區間 1.17–11.2)和 pH 值(相對風險 0.04, 95%可信區間 0.0005–0.38)都是多器官功能衰竭後死亡的獨立危險因素。

結論：多器官功能衰竭是高危病人術後死亡的主要原因。多器官功能衰竭後所致死亡的危險因素對於風險評分是重要的，同時可指導臨床診療。

（張婷　譯　陳傑　校）

BACKGROUND: Prediction of perioperative cardiac complications is important in the medical management of patients undergoing noncardiac surgery. However, these patients frequently die as a consequence of primary or secondary multiple organ failure (MOF), often as a result of sepsis. We investigated the early perioperative risk factors for in-hospital death due to MOF in surgical patients.
METHODS: This was a prospective, multicenter, observational cohort study performed in 21 Brazilian intensive care units (ICUs). Adult patients undergoing noncardiac surgery who were admitted to the ICU within 24 hours after operation were evaluated. MOF was characterized by the presence of at least 2 organ failures. To determine the relative risk (RR) of in-hospital death due to MOF, we performed a logistic regression multivariate analysis.
RESULTS: A total of 587 patients were included (mean age, 62.4 ± 17 years). ICU and hospital mortality rates were 15% and 20.6%, respectively. The main cause of death was MOF (53%). Peritonitis (RR 4.17, 95% confidence interval [CI] 1.38–12.6), diabetes (RR 3.63, 95% CI 1.17–11.2), unplanned surgery (RR 3.62, 95% CI 1.18–11.0), age (RR 1.04, 95% CI 1 0.01–1.08), and elevated serum lactate concentrations (RR 1.52, 95% CI 1.14–2.02), a high central venous pressure (RR 1.12, 95% CI 1.04–1.22), a fast heart rate (RR 3.63, 95% CI 1.17–11.2) and pH (RR 0.04, 95% CI 0.0005–0.38) on the day of admission were independent predictors of death due to MOF.
CONCLUSIONS: MOF is the main cause of death after surgery in high-risk patients. Awareness of the risk factors for death due to MOF may be important in risk stratification and can suggest routes for therapy.

綜述：高風險性手術：流行病學和預後

Review Article: High-Risk Surgery: Epidemiology and Outcomes

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術後併發症仍是世界範圍內較爲關注的公共健康問題。每年大約有超過 2.3 億台手術，其術後死亡率至少有 0.4%，術後併發症發生率爲 3%-7%。由於圍術期併發症與長期生存率的下降有關，故複雜的圍術期管理有其深遠的意義。在本文中，研究了與手術預後有關的一些重要因素。有關衛生保健提供的相關問題，如結構、進程和資源利用在各個研究所之間有差異性，因而導致統計所得術後死亡率和併發症發生率也有所不同。與病人相關的因素，尤其是否有合併症，功能性能力以及心血管狀態都與圍術期危險有關，這些情況可通過危險分層模型，運動試驗和生物標記來評估。這些評估方法的優缺點在文中均有闡述。本文同時還介紹了用於評估手術預後的方法的優缺點，這些方法包括以病人爲中心的一些變數比如病死率和併發症評分、病人相關預後測量方法等。最後，作者認爲將來的重點應放在提高那些評估圍

術期風險方法的準確性，以及提高評估手術醫療預後和品質方法的準確性。這些工具是高品質臨床試驗、流行病學研究和品質改進計畫的基礎。
（張婷　譯　陳傑　校）

Surgical morbidity is a significant public health issue worldwide. It is estimated that >230 million surgical procedures are performed each year, with an estimated mortality of at least 0.4% and morbidity of between 3% and 17%. Furthermore, there are potentially far-reaching consequences of a complicated perioperative course, because perioperative morbidity is associated with reduced long-term survival. In this review, we examine the factors that are associated with surgical outcomes. Issues related to the delivery of health care, such as structure, process, and resource utilization, have been shown to vary within and between institutions, leading to differences in both morbidity and mortality after surgery. Patient-related factors, in particular comorbid illness, functional capacity, and cardiovascular health, are also related to perioperative risk, and may be assessed using risk stratification models, exercise testing, and biomarker assays. The strengths and weaknesses of each of these techniques are discussed. We also review the strengths and limitations of the measures used to assess outcome after surgery, including patient-centered variables such as mortality and morbidity scores, and patient-related outcome measures. Finally, we suggest the direction of future work, which should be aimed at improving the precision of tools for describing perioperative risk, and of the measures used to assess the outcomes and quality of surgical health care. These tools are the building blocks of high-quality clinical trials, epidemiological studies, and quality improvement programs.

等比重局麻液脊麻前輸注晶體液與膠體液對局麻藥擴散及腦脊液流動影響的比較

A Comparison of the Effects of Preanesthetic Administration of Crystalloid Versus Colloid on Intrathecal Spread of Isobaric Spinal Anesthetics and Cerebrospinal Fluid Movement

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背景：等比重液脊麻時腦脊液（CSF）流動是影響麻醉藥擴散的最重要因素之一。由於不同的物理特性，麻醉前快速輸注膠體液或晶體液可導致腦脊液不同流向。作者研究了麻醉前預注晶體液或膠體液是否導致不同的腦脊液流向，是否影響麻醉藥的擴散。

方法：在一項等比重液脊麻的臨床研究中，患者隨機分爲 2 組：分別在 0.5%等比重丁卡因液行脊麻前根據隨機分組預注晶體液（n=30）或膠體液（n=30）。另外，23 名健康志願者在預輸晶體液或膠體液後 0，30，60min 行 L2 – 3 間隙及大腦導水管中部磁共振顯像檢查以研究腦脊液流動性。

結果：臨床研究顯示：晶體液組（27.2 ± 17.8min; P <0.01）相比於膠體液組（13.9 ± 7.0min）達到最高感覺阻滯水準的時間明顯延長。晶體液組感覺阻滯平面的中位數分別爲 T10（15min 時）和 T9.5（20min 時），明顯低於膠體液組（T8，T7； $P < 0.05$）。磁共振成像研究顯示：晶體液組預注後 30min， L2 – 3 間隙顱向 CSF 搏動性定向運動顯著下降，但膠體液組無此現象。晶體液組預注後 30min 時腦脊液生成率較基礎值（448μL/min）明顯增加（637μL/min, $P < 0.05$），60min 後略有下降（609μL/min）。膠體組的腦脊液生成率相比於基礎值無明顯差異（基礎狀態，30min 和 60min 後分別爲 464，512 和 542μL/min）。

結論：等比重脊麻時，與前負荷膠體液（效應相當於未作液體負荷）相比，前負荷晶體液能延長到達最高感覺阻滯平面的時間，可能由於 CSF 搏動性運動顯著降低有關。晶體液前負荷組 CSF 搏動性運動減弱的原因可能由於 CSF 產生增加所致。

（陳毓雯　譯　陳傑　校）

BACKGROUND: Movement of the cerebrospinal fluid (CSF) is one of the most important factors in determining the intrathecal spread of isobaric spinal anesthetics. Preanesthetic administration of either crystalloid or colloid immediately before spinal anesthesia (preload) may result in different CSF pulsatile movement because of their different physical properties. We examined whether preload of crystalloid versus colloid may have different effects on the intrathecal spread of isobaric spinal anesthetics as a result of their different CSF dynamics regarding its pulsatile movement.

METHODS: In a clinical study of isobaric spinal anesthesia, patients were allocated into 1 of 2 groups according to preload with either crystalloid ($n = 30$) or colloid ($n = 30$) before spinal anesthesia with 0.5 isobaric tetracaine. The pulsatile movements of CSF at the L2-3 intervertebral space and midportion of the aqueduct of Sylvius were also examined by magnetic resonance images in healthy volunteers ($n = 23$) at 0, 30, and 60 minutes after administering either crystalloid or colloid.

RESULTS: In the clinical study, the time to reach the peak sensory block level was delayed significantly in the crystalloid preload group (27.2 ± 17.8 minutes; $P < 0.01$) compared with the colloid preload group (13.9 ± 7.0 minutes). The median sensory block levels of the crystalloid preload group at 15 minutes (T10, $P < 0.05$) and 20 minutes (T9.5, $P < 0.05$) were significantly lower than those (T8, T7, respectively) of the colloid preload group. In the magnetic resonance imaging study, cranially directed CSF pulsatile movement decreased significantly at the L2-3 intervertebral intrathecal space at 30 minutes after crystalloid administration, but not after colloid administration. The CSF production rate significantly increased at 30 minutes (637 μL/min, $P < 0.05$) after crystalloid preload compared with the baseline measurement (448 μL/min), and then slightly decreased (609 μL/min) at 60 minutes. In the colloid preload group, the CSF production rate was not statistically significant compared with the baseline measurement (464, 512, and 542 μL/min at baseline, 30, and 60 minutes, respectively).

CONCLUSIONS: Compared with a colloid preload, which may be comparable to the no-preload condition, crystalloid preload prolonged the time to reach the peak sensory block level in isobaric spinal anesthesia, which might have been caused by a significant decrease in CSF pulsatile movement. This attenuated CSF pulsatile movement in the crystalloid preload group might have resulted from significant increases of CSF production.

利多卡因抑制小鼠培養皮層神經元酸敏感離子通道電流

Inhibition of Acid Sensing Ion Channel Currents by Lidocaine in Cultured Mouse Cortical Neurons

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背景：利多卡因是一種局部麻醉藥，有多種藥理作用包括抗心律失常，抗傷害作用以及神經保護。酸敏感離子通道（ASIC）是質子-門控陽離子通道，屬於上皮鈉通道/ 退化蛋白超（ENaC/DEG）家族成員。質子啓動 ASIC 使鈉和鈣離子內流。ASICs 參與各種生理過程包括學習/記憶，傷害和酸中毒介導的神經元損傷。在這項研究中，作者研究了利多卡因對培養小鼠皮層神經元 ASICs 的影響。

方法：應用全細胞膜片鉗技術啓動培養的小鼠皮層神經元 ASIC 電流並記錄。使用不同濃度的利多卡因進行實驗。爲確定利多卡因阻斷 ASIC 電流是否有亞基特異性，作者研究了利多卡因對中國倉鼠卵巢細胞中 ASIC1a 和 ASIC2a 表達的影響。

結果：利多卡因顯著抑制小鼠皮層神經元的 ASIC 電流。抑制作用是可逆的，並呈劑量依賴性。利多卡因濃度爲 0.3 mM 時檢測出抑制作用。在 30 mM 時 ASIC 電流約 90％被抑制。劑量-反應關係得出半數抑制濃度爲 11.79 ± 1.74 mM，最大抑制濃度爲 2.7 ± 0.5 mM（n = 10）。抑制效果迅速，且不依賴於 pH 值。在中國倉鼠卵巢細胞表達不同的 ASIC 亞基，利多卡因抑制 ASIC1a 而不影響 ASIC2a 電流。

結論：利多卡因能顯著抑制 ASIC 電流。本研究發現了利多卡因對神經元的一種新的藥理作用。

（陳毓雯　譯　陳傑　校）

BACKGROUND: Lidocaine is a local anesthetic that has multiple pharmacological effects including antiarrhythmia, antinociception, and neuroprotection. Acid sensing ion channels (ASICs) are proton-gated cation channels that belong to the epithelial sodium channel/degenerin superfamily. Activation of ASICs by protons results in sodium and calcium influx. ASICs have been implicated in various physiological processes including learning/memory, nociception, and in acidosis-mediated neuron injury. In this study, we examined the effect of lidocaine on ASICs in cultured mouse cortical neurons.

METHODS: ASIC currents were activated and recorded using a whole-cell patch-clamp technique in cultured mouse cortical neurons. The effects of lidocaine at different concentrations were examined. To determine whether the inhibition of lidocaine on ASIC currents is subunit specific, we examined the effect of lidocaine on homomeric ASIC1a and ASIC2a currents expressed in Chinese hamster ovary cells.

RESULTS: Lidocaine significantly inhibits the ASIC currents in mouse cortical neurons. The inhibition was reversible and dose dependent. A detectable effect was noticed at a concentration of 0.3 mM lidocaine. At 30 mM, ASIC current was inhibited by approximately 90%. Analysis of the complete dose-response relationship yielded a half-

maximal inhibitory concentration of 11.79 ± 1.74 mM and a Hill coefficient of 2.7 ± 0.5 (n = 10). The effect is rapid and does not depend on pH. In Chinese hamster ovary cells expressing different ASIC subunits, lidocaine inhibits the ASIC1a current without affecting the ASIC2a current.
CONCLUSION: ASIC currents are significantly inhibited by lidocaine. Our finding reveals a new pharmacological effect of lidocaine in neurons.

急性冠狀動脈綜合征患者的急診心臟手術：一項針對醫藥和機械治療的證據和圍術期診斷的綜述

Emergency Cardiac Surgery in Patients with Acute Coronary Syndromes: A Review of the Evidence and Perioperative Implications of Medical and Mechanical Therapeutics

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需行急診心臟手術的急性冠脈綜合征患者面臨複雜的管理挑戰。抗血小板和抗血栓藥物的早期使用可以提高急性心肌梗死病人的總體生存率，但爲了發揮藥物的最大好處，這些藥物往往在冠脈解剖狀況明確前和施行經皮冠狀動脈介入治療或外科血運重建術前就被使用。接受這些藥物治療的急性冠脈綜合征患者的死亡率增高與這些藥物導致的大出血事件有關，這可能是由於隨後停用了在其他方面能降低死亡率、中風率或心梗復發率的抗血小板和抗血栓藥物。心臟手術的患者術前接受如此強效的抗血小板和抗血栓藥物治療急性冠脈綜合征所導致的出血和輸血風險的增大是否影響患者長期的死亡率還不能確定。對於確定接受手術的患者，減少出血的策略包括停止抗凝治療，考慮血小板和/或凝血因數輸注，在可能的情況下對難治性出血輸注重組活化因數 VIIa。機械血流動力學的支持已經成爲對急性冠脈綜合征心源性休克患者的一種重要選擇。對於這些患者，圍術期的注意事項包括保持適度的抗凝，確保設備的穩定運作，以及定期檢驗正確的設備配置。支援這些設備應用的資料來源於沒有研究術後遠期預後的小試驗。繼續使用能降低心肌缺血風險的抗血小板和抗血栓藥，還是對將接受手術的患者做更好的圍術期出血風險分級和評估新的可逆性藥物的有效性，達到這兩者之間的平衡，這將是未來研究的方向。而機械血流動力學支持對患者長期預後的影響需要更嚴格的分析。
（楊秀娟 譯 馬皓琳 李士通 校）
Patients with acute coronary syndromes who require emergency cardiac surgery present complex management challenges. The early administration of antiplatelet and antithrombotic drugs has improved overall survival for patients with acute myocardial infarction, but to achieve maximal benefit, these drugs are given before coronary anatomy is known and before the decision to perform percutaneous coronary interventions or surgical revascularization has been made. A major bleeding event secondary to these drugs is associated with a high rate of death in medically treated patients with acute coronary syndrome possibly because of subsequent withholding of

antiplatelet and antithrombotic therapies that otherwise reduce the rate of death, stroke, or recurrent myocardial infarction. Whether the added risk of bleeding and blood transfusion in cardiac surgical patients receiving such potent antiplatelet or antithrombotic therapy before surgery specifically for acute coronary syndromes affects long-term mortality has not been clearly established. For patients who do proceed to surgery, strategies to minimize bleeding include stopping the anticoagulation therapy and considering platelet and/or coagulation factor transfusion and possibly recombinant-activated factor VIIa administration for refractory bleeding. Mechanical hemodynamic support has emerged as an important option for patients with acute coronary syndromes in cardiogenic shock. For these patients, perioperative considerations include maintaining appropriate anticoagulation, ensuring suitable device flow, and periodically verifying correct device placement. Data supporting the use of these devices are derived from small trials that did not address long-term postoperative outcomes. Future directions of research will seek to optimize the balance between reducing myocardial ischemic risk with antiplatelet and antithrombotics versus the higher rate perioperative bleeding by better risk stratifying surgical candidates and by assessing the effectiveness of newer reversible drugs. The effects of mechanical hemodynamic support on long-term patient outcomes need more stringent analysis.

於 P6 穴位的一些神經肌肉監測模式對於預防術後噁心嘔吐的作用

The Efficacy of Several Neuromuscular Monitoring Modes at the P6 Acupuncture Point in Preventing Postoperative Nausea and Vomiting

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背景：在本研究中，我們測試了對 P6 穴位的幾種神經肌肉監測模式對於預防術後噁心嘔吐（PONV）的作用。
方法：在本次前瞻性、雙盲隨機、安慰劑對照的試驗中，我們評估了 264 名行腹腔鏡下子宮切除術的婦女 PONV 的情況。用加速度法在尺神經處 1Hz 的單次刺激（ST）（n=54，對照組）和對正中神經上 P6 穴位的單次刺激（n=52）、四個成串刺激（n=53）、雙重爆發刺激（n=53）或強直刺激（n=52）來監測神經肌肉阻滯情況。
結果：在強直刺激 6 小時後，干預組較對照組病人的 PONV 的發生率（P=0.022）、病人自控鎮痛要求的次數（P=0.009）和病人自控鎮痛的總藥量（P=0.042）均顯著減少。總之，行強直刺激的干預組較對照組的病人對於 PONV 處理的滿意度更高。

結論：P6 穴位處的強直刺激較尺神經處的單次刺激可減輕腹腔鏡下子宮切除術病人 PONV 的情況，這使病人的滿意度大幅提高。而對於 P6 穴位的單次刺激、四個成串刺激、雙重爆發刺激均未顯著影響 PONV。
（毛祖旻 譯 馬皓琳 李士通 校）

BACKGROUND: In this study, we tested the efficacy of several neuromuscular monitoring modes at the P6 acupuncture point for preventing postoperative nausea and vomiting (PONV).
METHODS: In this prospective, double-blind, randomized, placebo-controlled trial, 264 women undergoing laparoscopic hysterectomy were evaluated for PONV. Neuromuscular blockade was monitored by acceleromyography with 1-Hz single twitch (ST) over the ulnar nerve (n = 54, control), and ST (n = 52), train-of-four (n = 53), double-burst stimulation (n = 53), or tetanus (n = 52) over the median nerve stimulating at the P6 acupuncture point.
RESULTS: The incidence of PONV (P = 0.022), the number of requests for patient-controlled analgesia (P = 0.009), and total patient-controlled analgesia volume (P = 0.042) 6 hours after tetanic stimulation were significantly reduced in the treatment group compared with the control group. Overall, patients in the tetanus group were more satisfied with the management of PONV compared with patients in the control group.
CONCLUSION: Tetanic stimulation applied to the P6 acupuncture point can reduce PONV after laparoscopic hysterectomy compared with ST stimulation of the ulnar nerve, resulting in a greater degree of patient satisfaction. None of the stimulations, ST, train-of-four, or double-burst, applied to the P6 acupuncture point significantly affected PONV.

鎮靜藥調節 T 細胞和淋巴細胞功能相關抗原-1 功能

Sedative Drug Modulates T-Cell and Lymphocyte Function-Associated Antigen-1 Function

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背景：鎮靜藥能通過幾個機制調節免疫細胞功能。然而，之前主要研究鎮靜藥對中性粒細胞和巨噬細胞免疫功能的影響，對淋巴細胞研究較少。淋巴細胞功能相關抗原-1（LFA-1）是個粘連分子，它在調節淋巴細胞免疫功能方面（包括白介素-2 的產生和淋巴細胞的增殖）發揮著重要作用。過去的臨床研究報導：異丙酚和異氟醚能減少病人的 IL-2 水準，但是咪達唑侖則不能。我們之前證實過異氟醚抑制了 LFA-1 與其反配體——細胞間粘附分子-1（ICAM-1）的結合，這或許促成了 IL-2 水準的減少。在本研究中，我們檢測了異丙酚、咪達唑侖和右美托咪定對 LFA-1/ICAM-1 結合的影響以及隨後的生物學反應。
方法：通過對人類外周血單核細胞的測熱試驗來測量鎮靜藥對 T 細胞增殖和 IL-2 產生的影響。因爲 LFA-1/ICAM-1 的結合對 T 細胞增殖和 IL-2 產生至關重要，所

以我們檢測鎮靜藥對 ICAM-1 結合到 LFA-1 蛋白的影響（無細胞試驗）。隨後，我們通過流式細胞儀分析表達在 T 細胞上的 LFA-1 與 ICAM-1 的結合（細胞試驗）。爲了確定藥物/LFA-1 相互作用是由競爭性還是由變構性抑制引起，我們分析了鎮靜藥對野生型和高親和力 LFA-1 的影響以及對一組與 LFA-1 不同區域結合的單克隆抗體的影響。

結果：在無細胞和細胞試驗中，異丙酚（10~100μM）均抑制了 ICAM-1 和 LFA-1 的結合（P<0.05）。然而，右美托咪定和咪達唑侖不影響 LFA-1/ICAM-1 的結合。異丙酚與靠近 ICAM-1 接觸區域的位元點以競爭性方式結合，從而直接抑制了 LFA-1 和 ICAM-1 的結合。在臨床相關濃度下，異丙酚，而非右美托咪定或咪達唑侖，抑制了 IL-2 的產生（P<0.05）。另外，異丙酚抑制了淋巴細胞的增殖（P<0.05）。

結論：我們的研究表明：異丙酚競爭性抑制 T 細胞上的 LFA-1 與 ICAM-1 的結合，並且抑制了 T 細胞增殖和 IL-2 的產生，然而右美托咪定和咪達唑侖對這些免疫學試驗無明顯影響。

（王海濤 譯；馬皓琳 李士通 校）

BACKGROUND: Sedative drugs modify immune cell functions via several mechanisms. However, the effects of sedatives on immune function have been primarily investigated in neutrophils and macrophages, and to the lesser extent lymphocytes. Lymphocyte function-associated antigen-1 (LFA-1) is an adhesion molecule that has a central role in regulating immune function of lymphocytes including interleukin-2 (IL-2) production and lymphocyte proliferation. Previous clinical studies reported that propofol and isoflurane reduced IL-2 level in patients, but midazolam did not. We previously demonstrated that isoflurane inhibited LFA-1 binding to its counter ligand, intercellular adhesion molecule-1 (ICAM-1), which might contribute to the reduction of IL-2 levels. In the current study, we examined the effect of propofol, midazolam, and dexmedetomidine on LFA-1/ICAM-1 binding, and the subsequent biological effects.

METHODS: The effect of sedative drugs on T-cell proliferation and IL-2 production was measured by calorimetric assays on human peripheral blood mononuclear cells. Because LFA-1/ICAM-1 binding has an important role in T-cell proliferation and IL-2 production, we measured the effect of sedative drugs on ICAM-1 binding to LFA-1 protein (cell-free assay). This analysis was followed by flow cytometric analysis of LFA-1 expressing T-cell binding to ICAM-1 (cell-based assay). To determine whether the drug/LFA-1 interaction is caused by competitive or allosteric inhibition, we analyzed the sedative drug effect on wild-type and high-affinity LFA-1 and a panel of monoclonal antibodies that bind to different regions of LFA-1.

RESULTS: Propofol at 10 to 100 μM inhibited ICAM-1 binding to LFA-1 in cell-free assays and cell-based assays ($P < 0.05$). However, dexmedetomidine and midazolam did not affect LFA-1/ICAM-1 binding. Propofol directly inhibits LFA-1 binding to ICAM-1 by binding near the ICAM-1 contact area in a competitive manner. At clinically relevant concentrations, propofol, but not dexmedetomidine or midazolam, inhibited IL-2 production ($P < 0.05$). Additionally, propofol inhibited lymphocyte proliferation ($P < 0.05$).

CONCLUSIONS: Our study suggests that propofol competitively inhibits LFA-1 binding to ICAM-1 on T-cells and suppresses T-cell proliferation and IL-2 production,

whereas dexmedetomidine and midazolam do not significantly influence these immunological assays.

神經肽 S 對大鼠全身麻醉的影響

The Effects of Neuropeptide S on General Anesthesia in Rats

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背景：神經肽 S（NPS）及其受體(NPSR)是一種新的調節覺醒及焦慮的神經肽系統。自然睡眠與全麻之間的關聯已被提出。因此，我們假設 NPS 神經元系統可能也參與調節了全身麻醉。
方法：測定腦室內 NPS 和一種肽類 NPSR 拮抗劑[D-Cys(tBu)^5]NPS 對氯胺酮及硫噴妥鈉在大鼠的麻醉時間的影響。麻醉時間的定義爲從正相反射消失到恢復之間的時間。
結果：腦室內 1~30 nmol 的 NPS 顯著減少了氯胺酮麻醉時間，顯示出鐘形劑量效應曲線。20 nmol [D-Cys(tBu)^5]NPS 可拮抗 1 nmol NPS 的效應，而且本身可以增加氯胺酮的麻醉時間。在硫噴妥鈉的麻醉時間中得到了類似的結果，麻醉時間在 NPS 作用下顯著減少，而在[D-Cys(tBu)^5]NPS 作用下顯著延長。
結論：NPS 通過選擇性啓動 NPSR 刺激覺醒加速途徑，因此縮短了麻醉時間。內源性 NPS/NPSR 系統似乎張力性地控制了這些途徑。
（瞿亦楓 譯 馬皓琳 李士通校）

BACKGROUND: Neuropeptide S (NPS) and its receptor (NPSR) is a novel neuropeptide system that regulates arousal and anxiety. A link between natural sleep and general anesthesia has been suggested. Therefore, we hypothesized that the NPS neuronal system may also modulate general anesthesia.
METHODS: The effects of intracerebroventricular NPS and [D-Cys(tBu)^5]NPS, a peptide NPSR antagonist, on ketamine and thiopental anesthesia time were measured in rats. Anesthesia time was defined as the interval between the loss of righting reflex and its recovery.
RESULTS: Intracerebroventricular NPS 1 to 30 nmol significantly reduced ketamine anesthesia time, showing a bell-shaped dose-response curve. [D-Cys(tBu)^5]NPS 20 nmol antagonized NPS 1 nmol effects and was per se able to increase ketamine anesthesia time. Similar results were obtained investigating thiopental anesthesia time that was significantly reduced by NPS and prolonged by [D-Cys(tBu)^5]NPS.
CONCLUSION: NPS via selective NPSR activation stimulates the wakefulness-promoting pathway, thus reducing anesthesia duration. The endogenous NPS/NPSR system seems to tonically control these pathways.

分娩硬膜外鎮痛時控制計劃性間斷給藥的時間間隔和給藥劑量對總藥物用量的影響：一個隨機對照試驗

The Effect of Manipulation of the Programmed Intermittent Bolus Time Interval and Injection Volume on Total Drug Use for Labor Epidural Analgesia: A Randomized Controlled Trial

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背景：硬膜外計劃性地間斷給麻醉藥溶液與持續輸注給藥相比，能減少麻醉藥的用量，提高患者滿意度。本研究爲隨機雙盲試驗，在硬膜外分娩鎮痛維持過程中控制計劃性間斷給藥的間隔時間和單次給藥劑量，我們評估了布比卡因及其他鎮痛藥的消耗量。
方法：入選健康、足月並要求自然分娩的初產婦，實施腰硬聯合鎮痛，先予鞘內注射布比卡因 1.25mg+芬太尼 15μg，然後給予硬膜外試驗劑量（利多卡因 45mg+腎上腺素 15μg）。將受試者隨機分入 3 組，每組採用不同的間斷給藥方案：每 15min 給予 2.5mL 組（2.5/15），每 30min 給予 5mL 組（5/30），或每 60min 給予 10mL 組（10/60）。硬膜外維持溶液包含有布比卡因 0.625mg/mL 和芬太尼 1.95μg/mL。對於突破性疼痛的處理，首先由產婦自控硬膜外給藥，隨後如有必要可由麻醉醫生手動給藥。主要觀察指標爲產程中每小時布比卡因的總用量。用線性混合效應模型來擬合每位元產婦每小時布比卡因的總用量；混合效應爲基礎布比卡因使用率，隨機效應爲疼痛評分-時間曲線下的面積。
結果：本實驗有 190 位產婦入選。10/60 組產程中每小時布比卡因修正用量中位數（四分位數間距）爲 8.8mg（8.0-9.7mg），5/30 組爲 10.0mg（9.3-10.8mg），2.5/15 組爲 10.4mg（9.6-11.2mg）（*P*=0.005）。疼痛評分-時間曲線下的面積、分娩時的疼痛評分、產婦自控硬膜外鎮痛藥的需求或給予、手動給藥以緩解突破性疼痛的次數、距第一次產婦自控硬膜外鎮痛或手動給藥的時間、以及產婦對分娩鎮痛的滿意度 3 組間沒有顯著性差異。
結論：將計劃性間斷給藥的時間間隔從 15min 延長到 60min，給藥劑量從 2.5mL 增加到 10mL，可以減少布比卡因的用量，而不影響產婦的舒適度和滿意度。
（徐妍君譯， 馬皓琳 李士通校）

BACKGROUND: Programmed intermittent bolus administration of epidural anesthetic solution compared with continuous infusion results in decreased anesthetic consumption and increased patient satisfaction. In this randomized and blinded study, we evaluated bupivacaine consumption and other analgesic outcomes when the programmed intermittent bolus time interval and volume were manipulated during the maintenance of epidural labor analgesia.
METHODS: Healthy, term, nulliparous women in spontaneous labor had combined spinal-epidural labor analgesia initiated with intrathecal bupivacaine 1.25 mg and fentanyl 15 μg, followed by an epidural test dose (lidocaine 45 mg with epinephrine 15 μg). Subjects were randomized to 1 of 3 programmed intermittent bolus dose regimens

for maintenance of analgesia: 2.5 mL every 15 minutes (2.5/15), 5 mL every 30 minutes (5/30), or 10 mL every 60 minutes (10/60). The maintenance epidural solution consisted of bupivacaine 0.625 mg/mL with fentanyl 1.95 μg/mL. Breakthrough pain was treated initially with patient-administered epidural bolus doses, followed by manual boluses administered by the anesthesiologist if necessary. The primary outcome was total bupivacaine consumption per hour of labor. A linear mixed-effects model was used to model each patient's overall bupivacaine consumption per hour; the fixed effect was basal bupivacaine administration rate and the random effect was the area under the pain score versus time curve.

RESULTS: One hundred ninety women were studied. The median (interquartile range) adjusted bupivacaine consumption per hour of labor was 8.8 mg (8.0–9.7 mg) in group 10/60 compared with 10.0 mg (9.3–10.8 mg) in group 5/30 and 10.4 mg (9.6–11.2 mg) in group 2.5/15 ($P = 0.005$). There were no differences in area under the pain score versus time curve, pain scores at delivery, patient-controlled epidural analgesia requests or administrations, number of manual bolus doses for breakthrough pain, time to first patient-controlled epidural analgesia or manual bolus dose, or patient satisfaction with labor analgesia.

CONCLUSIONS: Extending the programmed intermittent bolus interval and volume from 15 minutes to 60 minutes, and 2.5 mL to 10 mL, respectively, decreased bupivacaine consumption without decreasing patient comfort or satisfaction.

產科麻醉的知情同意

Informed Consent in Obstetric Anesthesia

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產科麻醉以及鎮痛的病人知情同意除了基礎的知情專案外還包括許多使人混淆的內容。這些內容包括產程活躍期容量、母胎衝突以及未成年人懷孕的照顧。在這篇綜述中我們集中討論這些特別知情項目。除了疼痛以及焦慮，女性保持理解以及回憶產程中告知的資訊的能力。麻醉醫師通常揭露高發病率以及高死亡率的副作用以及併發症。文字資料的應用以及早期的產前教育可以改善資訊的保留以及母親的滿意度。知情同意過程的成功導航需要對控制麻醉提供者管轄權的指導方針以及法律的知識。

（龔寅 譯 馬皓琳 李士通 校）

Patient consent for obstetric analgesia and anesthesia involves several confounding issues in addition to the basic elements of consent. These include capacity during active labor, maternal-fetal conflict, and the care of pregnant minors. In this review, we focus on these unique consent issues. Despite pain and anxiety, women maintain the capacity to understand and recall information imparted during labor. Anesthesia providers generally disclose high-frequency and high-morbidity side effects and complications. The use of written materials and early antenatal education may improve retention of information and

maternal satisfaction. Successful navigation of the consent process requires knowledge of the guidelines and laws that govern each provider's individual jurisdiction.

七氟烷預處理在大鼠通過活性氧介導的抗氧化酶上調產生神經保護作用

Sevoflurane Preconditioning Induces Neuroprotection Through Reactive Oxygen Species-Mediated Up-Regulation of Antioxidant Enzymes in Rats

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背景：據報導七氟烷預處理具有神經保護作用，但是其機理還不甚清楚。我們設計此研究試圖驗證這樣一個假設，即在引起缺血損傷前，給予七氟烷預處理能通過活性氧（ROS）的產生上調抗氧化酶活性減輕缺血再灌注損傷。
方法：預處理組中選取成年雄性 SD 大鼠，連續 5 天分別給予 1%、2%或 4%七氟烷預處理 1 h。於最後一次處理後第 24 h，所有大鼠通過閉塞大腦中動脈 120 min 誘導局部腦缺血，隨後 72 h 再灌注。通過每次預處理前給予自由基清除劑二甲基硫脲和抗氧化劑 N-乙醯半胱氨酸的方法，評估缺血耐受過程中 ROS 的作用。用神經學行爲分數和腦梗死體積估算評估腦缺血損傷。檢測最後一次七氟烷預處理後第 24 h 時，腦組織和血清中抗氧化酶（超氧化物歧化酶、過氧化氫酶和谷胱甘肽過氧化酶[GSH-px]）的活性。
結果：七氟烷預處理劑量依賴性地減少梗死面積和改善神經行爲學結果。二甲基硫脲和 N-乙醯半胱氨酸可以消除七氟烷預處理的神經保護作用。缺血損傷前接受七氟烷預處理可以提升腦組織中過氧化氫酶和谷胱甘肽過氧化酶(GSH-px)的活性。血清中 GSH-px 活性上調與腦組織梗死體積百分比成負相關。
結論：大鼠腦缺血損傷前七氟烷預處理，以劑量—反應方式通過 ROS 釋放和緊隨的抗氧化酶活性上調產生腦缺血耐受效應。血清 GSH-px 活性可以作爲評估缺血前七氟烷預處理有效性的一個標誌物。
(江繼宏 譯 馬皓琳 李士通 校）

BACKGROUND: It has been reported that sevoflurane preconditioning can induce neuroprotection, the mechanisms of which, however, are poorly elucidated. We designed the present study to examine the hypothesis that sevoflurane preconditioning could reduce cerebral ischemia– reperfusion injury through up-regulating antioxidant enzyme activities before ischemic injury by generating reactive oxygen species (ROS).
METHODS: In preconditioning groups, adult male Sprague–Dawley rats were pretreated with 1 hour sevoflurane exposure at a dose of 1%, 2%, or 4% for 5 consecutive days. At 24 hours after the last exposure, all rats were subjected to focal brain ischemia induced by middle cerebral artery occlusion for 120 minutes followed by 72-hour reperfusion. The role of ROS in ischemic tolerance was assessed by administration of the free radical scavenger dimethylthiourea and antioxidant *N*-acetylcysteine before each preconditioning. Brain ischemic injury was evaluated by neurologic behavior scores and brain infarct volume calculation. Antioxidant enzyme activities (superoxide dismutase,

catalase, and glutathione peroxidase [GSH-px]) of brain tissue and blood serum were tested at 24 hours after the last sevoflurane preconditioning.
RESULTS: Sevoflurane preconditioning reduced infarct size and improved neurobehavioral outcome in a dose-dependent manner. The neuroprotective effects of sevoflurane preconditioning were abolished by dimethylthiourea and *N*-acetylcysteine. The activities of catalase and glutathione peroxidase (GSH-px) in the brain tissue were elevated by sevoflurane preconditioning before ischemic injury. The up-regulated activity of GSH-px in serum negatively correlated with brain infarct volume percentage.
CONCLUSION: Sevoflurane preconditioning induces cerebral ischemic tolerance in a dose– response manner through ROS release and consequent up-regulation of antioxidant enzyme activity before ischemic injury in rats. Serum GSH-px activity could be developed as a marker to assess the effectiveness of sevoflurane preconditioning before ischemia.

結合超聲引導進行的持續股神經阻滯是否必然會發生髕骨運動反應？

Is a Patella Motor Response Necessary for Continuous Femoral Nerve Blockade Performed in Conjunction with Ultrasound Guidance?

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背景：成功的持續股神經阻滯（CFNB）在針刺和導管置入時往往能夠誘發髕骨運動反應。我們評估在結合超聲（US）引導進行的 CFNB 時是否必然會發生髕骨運動反應。
方法：在本同期組的觀察研究中，98 例患者接受 CFNB（聯合坐骨神經阻滯和脊麻）以行全膝關節成形術。單獨使用平面外 US 引導時，絕緣的 Tuohy 針針尖定位在短軸直視下的股神經中點位置的表面。開啓神經刺激器，記錄運動反應模式（髕骨還是中間肌）和來自於針的最小刺激電流。接著置入刺激導管，記錄運動反應的模式和來自於導管的最小電流。10 毫升 2%的甲呱卡因通過導管注入。最先出現的效果是感覺阻滯，定義爲注射甲呱卡因 20 分鐘後大腿遠端前面的針刺感消失。
結果：43 例患者出現了髕骨運動反應，43 例出現中間運動反應，以及 12 例對於導管刺激沒有運動反應。出現感覺阻滯的患者比例根據對導管刺激的運動反應不同而各不相同(髕骨[98%], 中間[91%], 沒有運動反應[75%]; $P = 0.02$)，但是對於導管刺激出現髕骨（98%）和中間（91%）運動反應之間沒有顯著性差異（P=0.58）。局麻藥注射後 20 分鐘出現運動阻滯的患者比例根據對導管刺激的運動反應不同也是各不相同(髕骨[95%], 中間[77%], 沒有運動反應[67%]; $P = 0.03$)。另外，導管刺激引出的髕骨（95%）和中間（77%）運動反應之間有顯著性差異（P=0.01）。導管誘發髕骨和中間運動反應的平均最小刺激電流沒有差異（P=0.06）。不管導管刺激引發什麼類型的運動反應，術後疼痛和鎮痛藥的消耗都相同。

結論：基於觀察得到的資料，當結合平面外 US 引導進行 CFNB 時，導管刺激誘導出的髕骨或者中間運動反應相似地導致大腿前面感覺阻滯。
（唐亮 譯 馬皓琳 李士通 校）

BACKGROUND: Successful continuous femoral nerve blockade (CFNB) has been associated with the elicitation of a patella motor response during needle and catheter insertion. We evaluated whether a patella motor response is necessary when CFNB is performed in conjunction with ultrasound (US) guidance.
METHODS: Ninety-eight patients undergoing CFNB (along with sciatic nerve block and spinal anesthetic) for total knee arthroplasty participated in this cohort observational study. Using out-of-plane US guidance alone, the tip of an insulated Tuohy needle was positioned superficial to the midpoint of the femoral nerve visualized in short axis. A nerve stimulator was turned on and the type of motor response (patella versus medial muscle) and minimum stimulating current from the needle were recorded. A stimulating catheter was then inserted and the type of motor response and minimum current from the catheter were recorded. Ten milliliters mepivacaine 2% was injected through the catheter. The primary outcome was sensory block defined as loss of sensation to pinprick on the anterior surface of the distal thigh measured 20 minutes after mepivacaine injection.
RESULTS: Forty-three patients demonstrated a patella motor response, 43 demonstrated a medial motor response, and 12 demonstrated no motor response from the catheter. The proportion of patients with sensory block differed according to motor response from the catheter (patella [98%], medial [91%], and no motor response [75%]; $P = 0.02$), but there was no significant difference between a patella (98%) and medial (91%) motor response from the catheter ($P = 0.58$). The proportion of patients with motor block 20 minutes after local anesthetic injection also differed according to motor response from the catheter (patella [95%], medial [77%], and no motor response [67%]; $P = 0.03$). In addition, there was a significant difference between a patella (95%) and medial (77%) motor response from the catheter ($P = 0.01$). The mean minimum stimulating currents did not differ between patella and medial motor responses elicited from the catheter ($P = 0.06$). Postoperative pain and analgesic consumption were similar regardless of the type of motor response from the catheter.
CONCLUSION: Based on observational data, a patella or medial motor response from the catheter similarly results in sensory block of the anterior thigh when CFNB is performed in conjunction with out-of-plane US guidance.

MP4OX 治療脊麻下初次髖關節成形術患者圍術期低血壓的一項隨機雙盲多中心臨床研究

A Double-Blind, Randomized, Multicenter Study of MP4OX for Treatment of Perioperative Hypotension in Patients Undergoing Primary Hip Arthroplasty Under Spinal Anesthesia.

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背景：作爲一種新型氧治療劑，MP4OX（氧化聚乙二醇修飾血紅蛋白）可顯著增強處於缺血或缺氧風險時組織的氧合和灌注。此項試驗旨在研究 MP4OX 處置圍術期低血壓的能力，並評判其在較大規模手術群體中的耐受性情況。
方法：將來自 5 個國家 21 個研究中心、預定於脊髓麻醉下行初次髖關節成形術的患者以雙盲方式隨機分配接受 MP4OX 或羥乙基澱粉（賀斯）溶液（萬汶®；賀斯 130/0.4）治療。當患者收縮壓下降至預定義觸發值時接受首次 250ml 試驗藥物。在初次給藥後，僅當收縮壓再次下降至預定義觸發水準時給予第二次 250ml 試驗藥物。主要的療效結果爲手術期間及皮膚縫合後最初 6 小時內低血壓發生的持續時間。
結果：在 474 名隨機患者中，共有 405 名患者達到了觸發水準並接受了至少一個劑量的試驗藥物。較賀斯組（137.6 ± 120.21 分鐘；極差，5-435 分鐘）而言，MP4OX 組（52.4 ± 71.50 分鐘；極差，3-442 分鐘）患者發生低血壓的持續時間明顯縮短（P < 0.0001）。MP4OX 組與賀斯組中意向性治療人群不良事件（AEs）的總體發生率相似（75.2% vs 73.4%；P = 0.733）。相對賀斯對照組，有較多 MP4OX 組患者在天冬氨酸氨基轉移酶（13.4% vs 7.4%；P = 0.052）、丙氨酸氨基轉移酶（6.9% vs 4.9%；P = 0.409）、脂肪酶（9.7% vs 3.6%；P = 0.015）及肌鈣蛋白（8.1% vs 2.0%；P = 0.006）等實驗室檢查中呈現短暫升高。兩組中嚴重不良事件的發生率無顯著差異（MP4OX 組 6.4% vs 賀斯對照組 3.0%；P = 0.106）。但在 MP4OX 組中，某些不良事件，譬如噁心（23.8% vs 14.3%；P = 0.016）、心動過緩（14.9% vs 5.9%；P = 0.003）、高血壓（8.4% vs 2.5%；P = 0.009）及少尿（5.9% vs 1.5%；P = 0.019）等確實更爲頻繁地發生。複合發病率與缺血終點並未顯示兩治療組有任何差異。
結論：MP4OX 的使用達到了治療脊麻下初次髖關節成形術患者圍術期低血壓的療效終點。但此項研究未能證明基於複合發病率或缺血終點的臨床效益。雖然有充足的證據證實 MP4OX 獲得了療效終點，但由於此項研究的安全性分析尚不能支援手術的風險收益情況，故並不建議在常規手術中使用 MP4OX。
（范羽譯 薛張綱校）
Background: MP4OX (oxygenated polyethylene glycol-modified hemoglobin) is a novel oxygen therapeutic agent specifically developed to perfuse and oxygenate tissue at risk for ischemia and hypoxia. In this study, we investigated the ability of MP4OX to treat hypotensive episodes. In addition, the tolerability profile of MP4OX in a large surgical population was established.
Methods: Patients from 21 study sites in 5 countries, scheduled to undergo primary hip arthroplasty under spinal anesthesia, were randomized in a double-blind manner to receive MP4OX or hydroxyethyl starch (HES) solution (Voluven® ; HES 130/0.4). Patients received the first 250-mL dose of investigational product when systolic blood pressure decreased to the predefined dosing trigger. A second 250-mL dose was given only if the systolic blood pressure decreased to the same trigger level after administration of the first dose. The primary efficacy outcome was total duration of all hypotensive episodes during surgery and the first 6 hours after skin closure.
Results: Of the 474 patients randomized, 405 reached the dosing trigger and received at least 1 dose. The mean total duration of all hypotensive episodes was significantly shorter (P < 0.0001) in the MP4OX group (52.4 ± 71.50 minutes; range, 3-442 minutes)

compared with the HES group (137.6 ± 120.21 minutes; range, 5-435 minutes). The overall incidence of adverse events (AEs) in the intent-to-treat population was similar between the MP4OX and HES groups (75.2% vs 73.4%; P = 0.733). Transient increases in laboratory values were reported in more patients in the MP4OX group versus HES controls for aspartate aminotransferase (13.4% vs 7.4%; P = 0.052), alanine aminotransferase (6.9% vs 4.9%; P = 0.409), lipase (9.7% vs 3.6%; P = 0.015), and troponin (8.1% vs 2.0%; P = 0.006). There was no significant difference in the incidence of serious AEs reported (6.4% in MP4OX group vs 3.0% in HES controls; P = 0.106). Certain AEs did occur more frequently in the MP4OX group, including nausea (23.8% vs 14.3%; P = 0.016), bradycardia (14.9% vs 5.9%; P = 0.003), hypertension (8.4% vs 2.5%; P = 0.009), and oliguria (5.9% vs 1.5%; P = 0.019). The composite morbidity and ischemia end points did not reveal any differences between the 2 treatment groups.
Conclusions: Administration of MP4OX achieved the end point of treating perioperative hypotension in patients undergoing primary hip arthroplasty under spinal anesthesia. The study was not powered to demonstrate clinical benefit based on the composite morbidity or ischemia outcomes. Although efficacy end points with sufficient power were met, MP4OX is not being proposed for use in routine surgery where the risk-benefit profile would not be favorable based on the safety profile demonstrated in this study.

Rolapitant用於預防術後噁心嘔吐：一項前瞻性、雙盲、安慰劑對照、隨機試驗

Rolapitant for the Prevention of Postoperative Nausea and Vomiting: A Prospective, Double-Blinded, Placebo-Controlled Randomized Trial.

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背景：術後噁心嘔吐(PONV)爲一種常見的術後併發症。神經激肽-1（NK1）受體拮抗劑已被證實用於預防和治療人類PONV安全有效。Rolapitant爲一種吸收迅速、半衰期相當長（達180 h）的強效選擇性NK1受體拮抗劑，潛在的藥物相互作用低。本項研究評價了Rolapitant在PONV高危人群中預防作用的量效關係，以後對於術後5天內發生的遲發性PONV的預防作用。

方法：這項Rolapitant隨機、多中心、雙盲、劑量範圍研究設有安慰劑和陽性對照組，納入619例行開腹手術的成年婦女，基於PONV或暈動病史進行分層，按照相同的比例將其隨機分入下列6個研究組之一：rolapitant口服劑量 5 mg組、20 mg組、70 mg組或200 mg組，昂丹司瓊4 mg I.V. 組或安慰劑組。主要研究終點爲，不考慮急救用藥，拔管後24 h無嘔吐次數。
結果：Rolapitant 5 mg、20 mg、70 mg或200 mg組患者的術後24 h無嘔吐發生率高於安慰機組。Rolapitant劑量與主要轉歸呈線性相關。與安慰劑組相比，rolapitant 70 mg 和 200 mg組的嘔吐次數明顯更低（P≤0.001，時序檢驗）。儘管術後24 h無嘔吐次數在Rolapitant組和陽性對照組（昂丹司瓊）沒有明顯差異，但Rolapitant 200 mg組和70 mg 組的術後72 h和120 h無嘔吐發生率更高（不考慮急救用藥）。
結論：Rolapitant降低術後嘔吐的療效優於安慰劑，還可以劑量依賴的方式降低嘔吐發生率，並且Rolapitant與安慰劑在不良反應方面沒有差異。
（黃劍譯 薛張綱校）

BACKGROUND: Postoperative nausea and vomiting (PONV) are common complications after surgery. Neurokinin-1 (NK(1)) receptor antagonists have been shown to be safe and effective for the prevention and treatment of PONV in humans. Rolapitant is a potent, selective NK1 receptor antagonist that is rapidly absorbed, has a remarkably long half-life (up to180 hours), and appears to have a low potential for drug-drug interactions. We evaluated the dose response for rolapitant for the prevention of PONV in subjects at high risk for this condition, and rolapitant's effects on preventing delayed PONV were explored up to 5 days after surgery.
METHODS: A randomized, multicenter, double-blind, dose-ranging study of rolapitant was conducted with placebo and active control groups. Six hundred nineteen adult women undergoing open abdominal surgery were randomly assigned in equal ratios to 1 of 6 study arms: oral rolapitant in 5-mg, 20-mg, 70-mg, or 200-mg doses; IV ondansetron 4 mg; or placebo, stratified by history of PONV or motion sickness. The primary study endpoint was absence of emetic episodes, regardless of use of rescue medication, at 24 hours after extubation.
RESULTS: Groups assigned to rolapitant 20-mg, 70-mg, and 200-mg had a higher incidence of no emesis in comparison with placebo at 24 hours after surgery. A linear relationship between rolapitant dose and primary outcome was seen. The probability of an emetic episode was significantly lower in the rolapitant 70-mg and 200-mg groups in comparison with placebo ($P \leq 0.001$ based on the log-rank test). No significant differences were noted between rolapitant and the active control (ondansetron) at 24 hours after surgery, but there was a higher incidence of no emesis (regardless of rescue medication use) in the rolapitant 200- and 70-mg groups at 72 and 120 hours, respectively.
CONCLUSION: Rolapitant is superior to placebo in reducing emetic episodes after surgery and reduces the incidence of vomiting in a dose-dependent manner. No differences in side effect profile were observed between rolapitant and placebo.

簡報：代謝綜合征與術前異常 P 波和 QT 間期

Brief Report: Preoperative Abnormal P and QTc Dispersion Intervals in Patients with Metabolic Syndrome

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我們評估 P 波離散度（Pwd），QT 間期，校正的 QT 間期（QTc），QT 間期離散度和校正的 QT 間期離散度（QTcd）與代謝綜合症（MetS）的關係。選擇擇期非心臟手術患者進行研究。記錄所有患者的主要診斷、人體測量、腰圍、BMI、心電圖、電解質、血清葡萄糖和脂代謝。運用 Bazett 公式計算 QTc、QTcd 時間間隔。MetS 組（M 組，n=36），均經成人教育組第三次報告（ATPIII）確診。對照組（C 組，n= 40）均爲年齡和性別與 M 組匹配的無代謝綜合症者。兩組之間在年齡，性別，血清電解質水準沒有差異（P>0.05）。腰圍、BMI、血糖、甘油三酯指標 M 組均明顯高於 C 組（P< 0.001）。 M 組 Pwd，QTc，QT 離散度及 QTcd 間隔顯著高於 C 組（P< 0.001）。這些發現與我們的回顧性分析表明，這些患者可能會面臨更大的圍術期心律失常的風險。
（毛慧譯，薛張剛校）

We evaluated P wave dispersion (Pwd), QT, corrected QT (QTc), QT dispersion, and corrected QT dispersion (QTcd) intervals in patients with metabolic syndrome (MetS). Patients scheduled to undergo elective noncardiac surgery were included in the study. The main diagnoses, anthropometric measurements, waist circumferences, body mass index, electrocardiograms, serum levels of electrolytes, glucose, and lipids were recorded for all patients. QTc, QTcd intervals were determined with the Bazett formula. MetS (group M, n = 36) was diagnosed using the Adult Treatment Panel III. Controls (group C, n = 40) were chosen on the basis of patients with no MetS and matched for age and gender. There were no differences between groups in terms of age, sex, or serum electrolyte levels (P > 0.05). Waist circumferences, body mass index, serum glucose, and triglyceride values in group M were significantly higher than those in group C (P < 0.001). In group M, Pwd, QTc, QT dispersion and QTcd intervals were significantly longer than those in group C (P < 0.001). This finding and our retrospective analysis suggest that these patients may be at greater risk of perioperative arrhythmias.

利多卡因對高速泳動族框 1 在脂多糖刺激後巨噬細胞中釋放的抑制作用

The inhibitory effect of lidocaine on the release of high mobility group box 1 in lipopolysaccharide-stimulated macrophages.

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背景：高速泳動族框 1(HMGB1)是一種關鍵炎症介質，在膿毒症時抑制凋亡細胞的吞噬作用。利多卡因已被證實可通過減弱細胞因數產生而在膿毒性腹膜炎小鼠中保

護巨噬細胞。但目前利多卡因是否也可影響 HMGB1 仍不明確。在本試驗中，我們在脂多糖刺激後的 RAW264.7 巨噬細胞中探尋了利多卡因對 HMGB1 釋放的作用。
方法：由脂多糖和不同濃度利多卡因孵育的 RAW264.7 細胞上清液中的 HMGB1 水準是由酶聯免疫吸附法測定的。HMGB1 的 mRNA 表達由即時聚合酶鏈反應所測定。HMGB1 從細胞核到細胞質的釋放和易位是由細胞免疫化學監測的。在 RAW264.7 細胞核部分的細胞核因數(NF)-kB 水準是由 Active Motif 的 NF-kB 家族試劑盒測定的。
結果：我們發現利多卡因抑制了 HMGB1 從細胞核到細胞質的易位，並減少了 HMGB1 在脂多糖誘導的 RAW264.7 細胞 mRNA 中的表達。此外，脂多糖刺激後的 NF-kB 從細胞質到細胞核的易位被利多卡因劑量相關性抑制。
結論：我們的資料表明：通過抑制 HMGB1 mRNA 的表達、HMGB1 和 NF-kB 從細胞核到細胞質的易位，利多卡因有著抗炎作用。闡明這些作用的機制可能比較棘手，但至少通過抑制了 NF-kB 信號通路。
（任雲譯 薛張綱校）

BACKGROUND: High mobility group box 1 (HMGB1), a key mediator of inflammation, has been shown to inhibit phagocytosis of apoptotic cells in sepsis. Lidocaine has been proven to protect macrophages in mice with septic peritonitis by attenuating the production of cytokines. However, it is currently unknown whether lidocaine also affects HMGB1. In this study, we sought to detect the effect of lidocaine on the release of HMGB1 from RAW264.7 macrophages after lipopolysaccharide (LPS) stimulation.
METHODS: The levels of HMGB1 in the supernatant of RAW264.7 cells incubated with LPS and different concentrations of lidocaine were measured by enzyme-linked immunosorbent assays. HMGB1 mRNA expression was assessed by real-time polymerase chain reaction. The immunocytochemistry was used to detect the release and translocation of HMGB1 from the nucleus to cytoplasm. Nuclear factor (NF)-κB levels in the nuclear fraction of RAW264.7 cells were measured with the Active Motif NF-κB family kit.
RESULTS: We found that lidocaine suppressed the translocation of HMGB1 from the nucleus to cytoplasm and decreased the expression of HMGB1 mRNA in RAW264.7 cells induced by LPS. Furthermore, the LPS-stimulated translocation of NF-κB from the cytoplasm to nucleus was inhibited by lidocaine in a dose-dependent manner.
CONCLUSIONS: Our data suggest that lidocaine functions as an antiinflammatory by inhibiting expression of HMGB1 mRNA, and translocating both HMGB1 and NF-κB from the nucleus to cytoplasm. The mechanism of these effects might be involved, at least partly, in the inhibition of the NF-κB signal pathway.

帶有多普勒超聲探頭的肺動脈導管進行持續的心輸出量監測。

Continuous Cardiac Output Measurement with a Doppler-Equipped Pulmonary Artery Catheter

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背景：我們開發了一種帶有多普勒探頭的肺動脈導管來持續監測主肺動脈的血流速度，而與肺動脈導管的成角和主肺動脈血流量無關。這個設備採用兩套正交相伴的多普勒換能器，從三角力學上來糾正每個換能器因血流成角帶來的差異。我們在動物身上用帶有多普勒探頭的肺動脈導管來持續監測心輸出量，通過和其他方法比較來測試這一方法的準確性。

方法：我們採用帶有多普勒探頭的肺動脈導管來監測狗的心輸出量。一對多普勒超聲換能器被安裝在肺動脈導管的遠端。多普勒的轉換是通過兩個在主肺動脈相鄰位置的換能器完成的。這兩個轉換資料通過電腦計算出血流的速度。主肺動脈的血流速度可通過具體的公式計算而來。心輸出量和主肺動脈血流速度一樣，都是靠變異係數相乘得來的。變異係數是由其他普通的測量方法測得的心輸出量和每次實驗最初的主肺動脈血流速度來計算的。我們對狗實施開胸術後，將一個電磁流量探頭放入它的主肺動脈內。心輸出量就會自動通過帶有多普勒探頭的肺動脈導管，電磁流量計和熱溫度稀釋法來測得。心輸出量通過多巴酚丁胺和普萘洛爾來調節。

結果：帶有多普勒的肺動脈導管測得的心輸出量通過電磁流量計數和熱稀釋法來進行矯正。電磁流量計數和多普勒肺動脈導管的偏差是−0.02 升/分，95%可信區間在−0.32 to 0.28 升/分。百分誤差在 16%。熱稀釋法和多普勒肺動脈導管的偏差在 0.18 升/分，95%的可信區間在−0.62 to 0.98 升/分。

總結：新開發的多普勒超聲肺動脈導管有兩套正交相伴的多普勒換能器，可以更加準確地，持續地監測心輸出量，而與肺動脈導管的成角和主肺動脈導管的血流量無關。

（翁梅琳譯 薛張綱校）

BACKGROUND: We developed a Doppler-equipped pulmonary artery catheter that provides continuous measurement of the true main pulmonary blood flow velocity independent of the angle of incidence formed by the pulmonary artery catheter and the main pulmonary artery blood flow. This device uses 2 orthogonally positioned Doppler transducers that allow trigonometric correction for differences in the angle of blood flow between each transducer. We tested the accuracy of the Doppler-equipped pulmonary artery catheter by comparing its cardiac output measurements with those done by conventional techniques in animals.

METHODS: The Doppler-equipped pulmonary artery catheter was evaluated in dogs. A pair of ultrasound Doppler transducers positioned at a fixed angle (90°) was mounted on the distal part of the thermodilution pulmonary artery catheter. The Doppler shifts (Δf1, Δf2) were detected by the 2 transducers sampling at 2 closely spaced points in the main pulmonary artery. The values of Δf1 and Δf2 were used to compute 2 velocity measurements. The true flow velocity of the main pulmonary artery was calculated with

the following equation: $V_{pulm} = \{(V_{transducer1})^2 + (V_{transducer2})^2\}^{1/2}$ (V_{pulm} = true main pulmonary artery velocity; $V_{transducer1}$ and $V_{transducer2}$ = velocity detected by transducers 1 and 2, respectively). The flow velocities were calculated by using a phase differential technique. Cardiac output was calculated as V_{pulm} multiplied by a coefficient value. The coefficient value was calculated by dividing cardiac output, derived from conventional techniques, by V_{pulm} at the beginning of each experiment. After thoracotomy, an electromagnetic flowprobe was placed around the main pulmonary artery in dogs. Cardiac output was simultaneously measured by the Doppler-equipped pulmonary artery catheter (CO-Doppler), and the electromagnetic flowmeter (CO-EMF) or the thermodilution technique (CO-Thermo). Cardiac output was manipulated by dobutamine and propranolol.

RESULTS: CO-Doppler was highly correlated with CO-EMF ($y = 1.16 \times -0.26$, $r^2 = 0.99$, $P < 0.001$) and CO-Thermo ($y = 1.24 \times -0.90$, $r^2 = 0.85$, $n = 48$, $P < 0.001$). The bias between CO-EMF and CO-Doppler was −0.02 L/min; 95% limits of agreement were −0.32 to 0.28 L/min. The percentage error was 16%. The bias between CO-Thermo and CO-Doppler was 0.18 L/min; 95% limits of agreement were −0.62 to 0.98 L/min.

CONCLUSIONS: The newly developed Doppler-equipped pulmonary artery catheter with 2 orthogonally positioned Doppler transducers allowed accurate and continuous measurements of cardiac output independent of the angle of incidence formed by the pulmonary artery catheter and the main pulmonary artery blood flow.

腎上腺素能提高持續室顫豬模型的 24 小時生存率且早期骨內注射優於延遲靜脈注射

Epinephrine Improves 24-Hour Survival in a Swine Model of Prolonged Ventricular Fibrillation Demonstrating that Early Intraosseous Is Superior to Delayed Intravenous Administration

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背景：在行心肺復蘇時，不能及時靜脈輸注（IV）升壓藥就不能提高生存率。骨內注射（IO）能提供更早的輸注途徑。我們假設在未經治療長達 10 min 的室顫（VF）致心臟停搏行心肺復蘇（CPR）1 min 後 IO 腎上腺素（一種“最佳的”IO 方案），與 CPR8 min 後 IV 腎上腺素（一種“現實存在的”方案）或 IV 不含腎上腺素的安慰劑相比，能改善結局。

方法：30 只豬隨機分爲 IO 腎上腺素組，IV 腎上腺素組或安慰劑組。重要的結局包括恢復自主迴圈（ROSC）情況、24 h 生存率和獲得良好神經學結局（大腦表現分類爲 1 級）的 24 h 生存率。

結果：10 min 仍未處理 VF 且未注射腎上腺素，則獲得 ROSC 的概率很低（1/10），而無論是 IO 腎上腺素還是延遲 IV 腎上腺素，其 ROSC 的幾率相似（分別爲 10/10 和 9/10，兩組和安慰劑組比較，P = 0.001）。IO 腎上腺素的 24 h 生存率明顯高於 IV 腎上腺素（10/10 vs. 4/10，P = 0.001），而安慰劑組 24 h 生存率爲 0。IO 腎上腺素組獲得良好神經學結局的生存率明顯高於安慰劑組（6/10 vs. 0/10，P = 0.011），而延遲 IV 腎上腺素組中只有 3/10 獲得良好神經學結局（與 IO 組和安慰劑組相比無顯著差異）。
結論：在持續性 VF 致心臟停搏的豬模型中，CPR 時注射腎上腺素能改善結局。此外，與延遲 IV 腎上腺素相比，早期骨內注射(IO)腎上腺素能改善結局。
（吳少勇譯 薛張綱校）

BACKGROUND: Vasopressors administered IV late during resuscitation efforts fail to improve survival. Intraosseous (IO) access can provide a route for earlier administration. We hypothesized that IO epinephrine after 1 minute of cardiopulmonary resuscitation (CPR) (an "optimal" IO scenario) after 10 minutes of untreated ventricular fibrillation (VF) cardiac arrest would improve outcome in comparison with either IV epinephrine after 8 minutes of CPR (a "realistic" IV scenario) or placebo controls with no epinephrine.
METHODS: Thirty swine were randomized to IO epinephrine, IV epinephrine, or placebo. Important outcomes included return of spontaneous circulation (ROSC), 24-hour survival, and 24-hour survival with good neurological outcome (cerebral performance category 1).
RESULTS: ROSC after 10 minutes of untreated VF was uncommon without administration of epinephrine (1 of 10), whereas ROSC was nearly universal with IO epinephrine or delayed IV epinephrine (10 of 10 and 9 of 10, respectively; P = 0.001 for either versus placebo). Twenty-four hour survival was substantially more likely after IO epinephrine than after delayed IV epinephrine (10 of 10 vs. 4 of 10, P = 0.001). None of the placebo group survived at 24 hours. Survival with good neurological outcome was more likely after IO epinephrine than after placebo (6 of 10 vs. 0 of 10, P = 0.011), and only 3 of 10 survived with good neurological outcome in the delayed IV epinephrine group (not significant versus either IO or placebo).
CONCLUSION: In this swine model of prolonged VF cardiac arrest, epinephrine administration during CPR improved outcomes. In addition, early IO epinephrine improved outcomes in comparison with delayed IV epinephrine.

家長對於麻醉資訊的回憶:爲知情同意的實踐提供資訊

Parental Recall of Anesthesia Information: Informing the Practice of Informed Consent

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背景：知情同意是爲保障兒童家長做決定而提供資訊的過程。雖然知情同意的過程在麻醉實踐過程中很重要,很少有人核查這個過程。正因如此,關於這方面的資料很少,特別在兒童方面。因此,我們設計了這個試驗來調查家長回憶的關於他們孩子的麻醉資訊,例如告知他們的,誰告知他們的,以及他們能回憶出的信息量。

方法：進行多種類型擇期手術的兒童家長在他們的孩子進行手術時被納入研究.家長就他們孩子的麻醉計畫、術後鎮痛和相關的風險和獲益方面進行訪談，同時調查了他們所關心的問題和被告知的資訊，以及他們對於這些資訊的滿意度。
結果：共調查了 263 名家長。雖然大多數家長（96.2%）都被告知了 他們的孩子將怎樣被麻醉，但是只有 51.1%家長記得被告知了麻醉的風險，42.4%的家長記得麻醉的副反應如何處理。家長關於麻醉資訊的綜合評分總體很差（4.9±2.5，總分 10 分）。另外，有 50%和 55.7%的家長不記得麻醉的風險和益處，82.9%的家長不記得麻醉藥的副作用。比起外科醫生進行麻醉知情同意，由麻醉醫生進行時家長能回憶的資訊很多（P<0.01）。
結論：結果顯示家長獲得的麻醉資訊通常是不完整的,所以他們記得的東西很少。調查發現比起外科醫生進行麻醉知情同意，由麻醉醫生進行時家長能回憶的資訊很多,由此在由誰進行麻醉資訊告知這一問題的爭論中提出了依據。
（姚敏敏譯 薛張綱校）

BACKGROUND: Informed consent is a process of sharing information that facilitates the individual patient's right to self-determination. Despite its importance in anesthesia practice, the process of informed consent is rarely audited or examined. As such, there are only limited data with respect to anesthesia consent practices, particularly within the pediatric setting. We designed this study, therefore, to examine the information that parents seek regarding their child's anesthesia, what they are told, who told them, and how much of the information they recall.
METHODS: Parents of children undergoing a variety of elective surgical procedures were recruited while their child was in surgery. Parents were interviewed to determine their recall of their child's anesthetic plan, postoperative pain management, and attendant risks and benefits; and then surveyed regarding what information was sought and received, and how satisfied they were with the information.
RESULTS: Two hundred sixty-three parents were included. Although the majority (96.2%) recalled receiving information about how their child's anesthesia would be administered, only 51.1% recalled being given information about the risks of anesthesia and 42.4% recalled how side effects would be managed. Composite scores for parental recall of anesthesia information were generally poor (4.9 ± 2.5 of 10). Furthermore, 50% and 55.7% of parents had no recall of the risks or benefits of anesthesia, respectively, and 82.9% could not recall pain medication side effects. Recall of consent information provided by anesthesia providers was significantly better than when provided by surgical personnel ($P < 0.01$).
CONCLUSIONS: Results showed that disclosure of anesthesia information to parents was often incomplete, and their recall thereof, was poor. The finding that recall of consent information provided by anesthesia providers was better than when provided by surgical personnel may serve to further the debate regarding the appropriate vehicles for anesthesia consent.

加巴噴丁的鞘內注射和全身用藥對脊髓 P 物質釋放的影響

The Effects of Intrathecal and Systemic Gabapentin on Spinal Substance P Release

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背景：加巴噴丁與細胞外電壓門控鈣離子通道的 21 亞基結合。一些電壓門控鈣離子通道控制著 P 物質的初級傳入。我們試圖探明在體內加巴噴丁的脊髓和全身鎮痛劑量的用藥是否會影響 P 物質的釋放。
方法：置入鞘內導管的大鼠在鞘內應用 vehicle 或加巴噴丁 10 分鐘後行 50 毫升 5%福馬林鞘內注射。全身實驗時 vehicle 或加巴噴丁則通過外周注射，15 分鐘後注射福馬林。在不同的組裏，爲了評估鞘內或靜脈注射加巴噴丁對福馬林誘發 P 物質釋放的影響，實驗動物接受了類似的處理即在注射福馬林 10 分鐘後經行心內 4%聚合福馬林灌注，並通過退縮反應來評估。P 物質的釋放通過同側和對側表面免疫組織內的神經激肽一1 受體的產生來判斷。
結果：福馬林鞘內注射後刺激單側足底會誘發雙側肢體退縮反應。與對照組大鼠相比鞘內注射加巴噴丁（100 和 200 克）和外周注射加巴噴丁（100 和 200mg/kg）導致劑量依賴性的 2 相的退縮反射的減退而不是 1 相的減退。鞘內注射福馬林導致同側而非對側的脊髓背角 NK1r 內化。與對照組比鞘內注射加巴噴丁（200g 而非 100g）和外周注射加巴噴丁（200mg/kg 而非 100mg/kg）顯著地減少了同側 NK1r 內化。
結論：全身和脊髓內用加巴噴丁有繼續抑制 P 物質釋放的初級傳入，且同時有抑制疼痛敏化的效應。
（張玥琪譯，薛張綱校）

BACKGROUND: Gabapentin binds at the extracellular 2 1 subunit of voltage- sensitive calcium channels. Some voltage-sensitive calcium channels regulate substance P release from small primary afferents. We sought to determine in vivo whether spinal and systemic gabapentin at antihyperalgesic doses will attenuate substance P release.
METHODS: Rats prepared with chronic intrathecal (IT) catheters received IT vehicle or gabapentin 10 minutes before intraplantar formalin (5%, 50 L) injection. For systemic studies, vehicle or gabapentin was delivered intraperitoneally (IP) 15 minutes before formalin injection. In separate groups of rats, to assess the effect of IT or IP gabapentin upon formalin-evoked substance P release, animals received similar treatment for assessment of flinching, but underwent transcardial perfusion with 4% paraformaldehyde 10 minutes after the formalin injection. Substance P release was determined by the incidence of neurokinin 1 receptor (NK1r) internalization in the ipsilateral and contralateral superficial dorsal horn in immunofluorescent stained tissues.
RESULTS: Unilateral intraplantar formalin evoked biphasic hindpaw flinching. IT gabapentin (100 and 200 g) and IP gabapentin (100 and 200 mg/kg) resulted in a dose-dependent reduction in phase 2, but not phase 1, flinching in comparison with vehicle-treated rats. Intraplanatar formalin resulted in NK1r internalization in the ipsilateral, but not contralateral, superficial dorsal horn. IT gabapentin (200 g, but not 100 g) and IP gabapentin (200 mg/kg, but not 100 mg/kg) significantly reduced ipsilateral NK1r internalization in comparison with vehicle-treated control. Importantly, internalization evoked by IT substance P was not blocked by IT gabapentin.

CONCLUSION: Systemic and spinal gabapentin have an acute inhibitory effect on the release of substance P from small primary afferents and a concurrent effect upon the initiation of facilitated pain states.

簡要報導：與傳統方法相比低位肌間溝臂叢阻滯可產生更遠的感覺運動阻滯覆蓋效果

Brief Report: A Low Approach to Interscalene Brachial Plexus Block Results in More Distal Spread of Sensory-Motor Coverage Compared to the Conventional Approach

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低位肌間溝阻滯與傳統肌間溝阻滯相比能使局麻藥延臂叢向尾端擴散得更遠。我們比較了 254 例行上肢手術的患者低位肌間溝阻滯與傳統肌間溝阻滯遠端肢體麻醉的效果。傳統肌間溝阻滯最常引起運動反應的是三角肌，而低位肌間溝阻滯是腕部。與傳統肌間溝阻滯相比低位肌間溝阻滯能產生更大的肘以下區域的感覺運動阻滯（感覺與運動 P< 0.001）。我們的資料表明低位元肌間溝阻滯引起更高機率的遠端運動反應和更好的腕和手的感覺運

（朱蘭芳譯，薛張綱校）

A low approach to the interscalene block (LISB) deposits local anesthetic farther caudad on the brachial plexus compared with the conventional interscalene block (ISB). We compared the efficacy of LISB and ISB in achieving anesthesia of the distal extremity in 254 patients having upper extremity surgery. The most frequent elicited motor response was the deltoid for ISB and wrist for LISB. There was significantly greater sensory-motor block of regions below the elbow with the LISB compared with ISB ($P < 0.001$ for both sensory and motor coverage). Our data indicate that LISB results in a higher incidence of distal elicited motor response and greater sensory-motor blockage of the wrist and hand.