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Continuous Ultrasound-Guided Adductor Canal Block for Total Knee Arthroplasty: A Randomized, Double-Blind Trial

老年患者與年輕患者術中輸血概率的對比
Odds of Transfusion for Older Adults Compared to Younger Adults Undergoing Surgery

背景：最近的隨機對照實驗發現：相對於血紅蛋白更低的患者，對圍術期血紅蛋白大於10g/dL的患者輸血並無益處，甚至老年患者亦如此。然而相對於年輕患者，外科醫生選擇給老年患者輸血更隨意。老年患者圍術期輸血概率是否較年輕患者更高並未確定。此項研究的目的是確定圍術期老年患者輸血的概率是否比年輕患者更高。

方法：在一個三級醫療中心進行了此項回顧性、觀察佇列研究，納入了2010年1月至2012年2月期間在該中心做過外科手術的住院病人。通過多層多變數邏輯回歸分析的方法，並校正了佇列因素、外科種類、估測外科失血量和住院期間最低血紅蛋白值、性別和術中估測失血量因素和外科醫生和手術綜合分析，來比較大於65歲患者與更年輕患者輸血的概率差異。

結果：在這個分析中納入了20930個患者。在校正佇列因素、外科種類、估測外科失血量和住院期間最低血紅蛋白值差異後，並以外科醫生和手術類型作為隨機因素的多層分析模式中，大於65歲患者的輸血概率比年輕患者高62%（比值比為1.62，95%可信區間為1.40-1.88；P<0.0001）。當把病人按住院期間最低血紅蛋白值分層時（7.00-7.99, 8.00-8.99, 9.00-9.99,以及大等於10.00 g/dL），每層中患者輸血概率隨著年齡增加（每十歲）而增加，住院期間最低血紅蛋白不低於10.00 g/dL的患者除外。當比較年輕和年老患
BACKGROUND: Recent randomized controlled trials have shown no benefit for transfusion to a hemoglobin >10 g/dL compared with lower hemoglobin thresholds in the perioperative period, even among older adults. Nevertheless, physicians may choose to transfuse older adults more liberally than younger adults. It is unclear whether older patients have higher odds than younger patients of being transfused in the perioperative period. Our objective in this study was to determine whether the odds of transfusion are higher in older patients than in younger patients in the perioperative period.

METHODS: We conducted this retrospective observational cohort study at a tertiary care academic medical center. We included adults who had undergone a surgical procedure as an inpatient at our institution from January 2010 to February 2012. The primary analysis compared the odds of transfusion for patients >65 years old with the odds of transfusion in younger patients based on multilevel multivariable logistic regression analyses including adjustment for comorbidities, surgical service, lowest in-hospital hemoglobin value, gender, and estimated surgical blood loss and accounted for clustering by the surgeon and procedure.

RESULTS: We included 20,930 patients in this analysis. In multilevel models adjusted for comorbidities, surgical service, estimated surgical blood loss, and lowest in-hospital hemoglobin value, with surgeon and procedure as random effects, patients >65 years old had 62% greater odds (odds ratio, 1.62; 95% confidence interval, 1.40–1.88; P < 0.0001) of being transfused than did younger patients. When patients were stratified by lowest in-hospital hemoglobin (7.00–7.99, 8.00–8.99, 9.00–9.99, and ≥10.00 g/dL), the odds of transfusion generally increased with each additional decade of age in every stratum, except for that containing patients in whom the lowest in-hospital hemoglobin did not decrease below 10 g/dL. When the odds of transfusion were compared between younger and older patients, significant differences were observed among surgical services (P = 0.02) but not among anesthesia specialty divisions (P = 0.9).

CONCLUSIONS: Older adults have greater odds of receiving red blood cell transfusion in the perioperative period than do younger patients, despite the lack of evidence supporting higher hemoglobin triggers in elderly patients. Further research is needed to determine whether transfusion practice in the elderly is an opportunity for education to improve blood management.
BACKGROUND: Obesity is epidemic in the United States and with it comes an increased incidence of obstructive sleep apnea (OSA). Evidence regarding opioid sensitivity as well as recent descriptions of deaths after tonsillectomy prompted a survey of all members of the Society for Pediatric Anesthesia regarding adverse events in children undergoing tonsillectomy.

METHODS: An electronic survey was sent to 2377 members of the Society for Pediatric Anesthesia. Additionally, data from the American Society of Anesthesiologists Closed Claims Project were obtained. Adverse events during or after tonsillectomy with or without adenoidectomy in children were included. Children at risk for OSA were identified as either having a positive history for OSA or a post hoc application of the American Society of Anesthesiologists OSA practice guidelines. These children were compared with all other children by Fisher exact test for proportions and t test for continuous variables.

RESULTS: A total of 129 cases were identified from the 731 replies to the survey, with 92 meeting inclusion criteria for having adequate data. Another 19 cases with adequate data were identified from the 45 from the American Society of Anesthesiologists Closed Claims Project. A total of 111 cases were included in the final analysis. Death and permanent neurologic injury occurred in 86 (77%) cases and were reported in the operating room, postanesthesia care unit, on the ward, and at home. Sixty-three (57%) children fulfilled American Society of Anesthesiologists criteria to be at risk for OSA. Children categorized as at risk for OSA were more likely than other children to be obese and to have comorbidities (P < 0.0001). A larger proportion of at risk children had the event attributed to apnea (P = 0.016), whereas all others had a larger proportion of events attributed to hemorrhage (P = 0.006).

CONCLUSIONS: Deaths or neurologic injury after tonsillectomy due to apparent apnea in children suggest that at least 16 children could have been rescued had respiratory monitoring been continued throughout first- and second-stage recovery, as well as on the ward during the first postoperative night. A validated pediatric-specific risk assessment scoring system is needed to assist with identifying children at risk for OSA who are not appropriate to be cared for on an outpatient basis.
BACKGROUND: Pharmacokinetic (PK) models are used to predict drug concentrations for infusion regimens for intraoperative displays and to calculate infusion rates in target-controlled infusion systems. For propofol, the PK models available in the literature were mostly developed from particular patient groups or anesthetic techniques, and there is uncertainty of the accuracy of the models under differing patient and clinical conditions. Our goal was to determine a PK model with robust predictive performance for a wide range of patient groups and clinical conditions.

METHODS: We aggregated and analyzed 21 previously published propofol datasets containing data from young children, children, adults, elderly, and obese individuals. A 3-compartmental allometric model was estimated with NONMEM software using weight, age, sex, and patient status as covariates. A predictive performance metric focused on intraoperative conditions was devised and used along with the Akaike information criteria to guide model development.

RESULTS: The dataset contains 10,927 drug concentration observations from 660 individuals (age range 0.25–88 years; weight range 5.2–160 kg). The final model uses weight, age, sex, and patient versus healthy volunteer as covariates. Parameter estimates for a 35-year, 70-kg male patient were: 9.77, 29.0, 134 L, 1.53, 1.42, and 0.608 L/min for V1, V2, V3, CL, Q2, and Q3, respectively. Predictive performance is better than or similar to that of specialized models, even for the subpopulations on which those models were derived.

CONCLUSIONS: We have developed a single propofol PK model that performed well for a wide range of patient groups and clinical conditions. Further prospective evaluation of the model is needed.
While rare, anesthesia breathing system obstruction can have devastating consequences. We created simulated occlusions of the expiratory and inspiratory limb of the circle breathing system in 3 current anesthesia workstations; Aisys, ADU (both by GE Healthcare, Madison WI), and Apollo (Draeger Medical, Telford, PA). The automated electronic checkout specific to each machine was then performed. The Aisys allowed users to accept both faults and initiate simulated patient care; the ADU and Apollo did not. Users must be aware of how to test for breathing circuit obstruction, and whether their own equipment does so adequately in the automated checkout.

**Benzodiazepine Site Agonists Differentially Alter Acetylcholine Release in Rat Amygdala**

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**BACKGROUND:** Benzodiazepine site agonists alter γ-aminobutyric acid type A receptors diminishes anxiety and insomnia by actions in the amygdala. The neurochemical effects of benzodiazepine site agonists remain incompletely understood. Cholinergic neurotransmission modulates amygdala function, and this study tested the hypothesis that benzodiazepine site agonists alter acetylcholine (ACh) release in the amygdala.
METHODS: Microdialysis and high-performance liquid chromatography quantified ACh release in the amygdala of Sprague-Dawley rats (n=33). ACh was measured before and after IV administration (3 mg/kg) of midazolam or eszopiclone, with and without anesthesia. ACh in isoflurane-anesthetized rats during dialysis with Ringer’s solution (control) was compared with ACh release during dialysis with Ringer’s solution containing (100 μM) midazolam, diazepam, eszopiclone, or zolpidem.

RESULTS: In unanesthetized rats, ACh in the amygdala was decreased by IV midazolam (−51.1%; P = 0.0029; 95% confidence interval [CI], −73.0% to −29.2%) and eszopiclone (−39.6%; P = 0.0222; 95% CI, −69.8% to −9.3%). In anesthetized rats, ACh in the amygdala was decreased by IV administration of midazolam (−46.2%; P = 0.0041; 95% CI, −67.9% to −24.5%) and eszopiclone (−34.0%; P = 0.0009; 95% CI, −44.7% to −23.3%), and increased by amygdala delivery of diazepam (43.2%; P = 0.0434; 95% CI, 2.1% to 84.3%) and eszopiclone (222.2%; P = 0.0159; 95% CI, 68.5% to 375.8%).

CONCLUSIONS: ACh release in the amygdala was decreased by IV delivery of midazolam and eszopiclone. Dialysis delivery directly into the amygdala caused either increased (eszopiclone and diazepam) or likely no significant change (midazolam and zolpidem) in ACh release. These contrasting effects of delivery route on ACh release support the interpretation that systemically administered midazolam and eszopiclone decrease ACh release in the amygdala by acting on neuronal systems outside the amygdala.
cortical activations in response to pain, compared with rehydration with an oral rehydration solution (ORS) by functional magnetic resonance imaging.

METHODS: Five healthy adult men were subjected to dehydration and rehydration on 2 different days. The condition on the first day was randomly assigned to each subject. They completed a 40-minute exercise protocol using a walking machine after 12 hours of fasting under both conditions. For rehydration, the subjects consumed up to 3000 mL ORS starting from the night before the test day. After exercise, a painful stimulus (cold pressor test) was applied to the subjects’ medial forearm in a magnetic resonance imaging scanning gantry, and pain-evoked brain activation was analyzed.

RESULTS: On the rehydration day, each of the subjects consumed an average of 2040 mL (range; 1800–2500 mL) ORS. Physiological data revealed that subjects when dehydrated lost more weight from exercise than subjects when rehydrated had a larger heart rate increase, a higher tympanic temperature, and a higher urine osmolality. Subjective data revealed that the subjects reported significantly stronger thirst while dehydrated than while rehydrated with ORS, although the levels of hunger and anxiety and mood did not significantly differ between conditions. The cold pressor test robustly activated the pain-related neural network, notably the anterior cingulate cortex, insula, and thalamus. Such activations in the dehydrated subjects were greater than those in the rehydrated subjects in terms of peak and cluster, accompanied by a decrease in pain threshold (P = 0.001).

CONCLUSION: Our findings suggest that dehydration brings about increased brain activity related to painful stimuli together with enhanced thirst, whereas rehydration with ORS alleviates thirst and decreases brain activity related to painful stimuli.

小鼠鞘內注射 Myr-NR2B9c 肽通過干擾 NMDA 受體和 PSD-95 蛋白間作用減輕骨癌疼痛

Intrathecal Injection of the Peptide Myr-NR2B9c Attenuates Bone Cancer Pain Via Perturbing N-Methyl-D-Aspartate Receptor-PSD-95 Protein Interactions in Mice

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BACKGROUND: N-methyl-D-aspartate receptor (NMDARs)-dependent central sensitization plays an important role in cancer pain. Binding of NMDAR subunit 2B (NR2B) by postsynaptic density protein-95 (PSD-95) can couple NMDAR activity to intracellular enzymes, such as neuronal nitric oxide synthase (nNOS), facilitate downstream signaling pathways, and modulate NMDAR stability, contributing to synaptic plasticity. In this study, we investigated whether perturbing the specific interaction between spinal NR2B-containing NMDAR and PSD-95, using a peptide-mimetic strategy, could attenuate bone cancer-related pain behaviors.

METHODS: Osteosarcoma cells were implanted into the intramedullary space of the right femurs of C3H/HeJ mice to induce progressive bone cancer-related pain behaviors. Western blotting was applied to examine the expression of spinal phospho-Tyr1472 NR2B, nNOS, and PSD-95. We further investigated the effects of intrathecal injection of the mimetic peptide Myr-NR2B9c, which competitively disrupts the interaction between PSD-95 and NR2B, on nociceptive behaviors and on the upregulation of phospho-Tyr1472 NR2B, nNOS, and PSD-95 associated with bone cancer pain in the spinal cord.

RESULTS: Inoculation of osteosarcoma cells induced progressive bone cancer pain and resulted in a significant upregulation of phospho-Tyr1472 NR2B, nNOS, and PSD-95. Intrathecal administration of Myr-NR2B9c attenuated bone cancer-evoked mechanical allodynia, thermal hyperalgesia, and reduced spinal phospho-Tyr1472 NR2B, nNOS, and PSD-95 expression.

CONCLUSIONS: Intrathecal administration of Myr-NR2B9c reduced bone cancer pain. Internalization of spinal NR2B and dissociation NR2B-containing NMDARs activation from downstream nNOS signaling may contribute to the analgesic effects of Myr-NR2B9c. This approach may circumvent the negative consequences associated with blocking NMDARs, and may be a novel strategy for the treatment of bone cancer pain.

超聲引導下內收肌管連續阻滯用於全膝關節置換術：一項隨機雙盲實驗
Continuous Ultrasound-Guided Adductor Canal Block for Total Knee Arthroplasty: A Randomized, Double-Blind Trial

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背景：在減少全膝關節置換術患者術後疼痛方面，內收肌管阻滯已經展現了其潛力。然而沒有任何隨機對照研究評估在內收肌管中連續輸注0.2%羅呱卡因是否能減少阿片類藥物的使用。本文假設連續內收肌管阻滯可以減少術後阿片類藥物的使用。

方法：80例初次行單側全膝關節置換術患者隨機接受超聲引導下連續0.2%羅呱卡因內收肌管阻滯或者接受假導管放置。術前所有患者都接受單次股神經阻滯和脊麻，這是本機構的一項標準麻醉方式。在調整基線後，協方差分析評估術後48小時累積IV嗎啡消耗量。次要結果包括靜息疼痛評分（numeric rating scale），術後1天和2天物理治療時的疼痛高峰評分，股四頭肌最大等長收縮，物理治療時的走動距離，術後噁心、嘔吐和對鎮痛的滿意度。

結果：80名受試者被隨機分配，76名完成了協議研究。48h累計嗎啡消耗量（阻滯－對照）的最小均方差為16.68mg（95%置信區間：29.78－3.59，P = 0.013）。兩組24h和48h（預測的股神經阻滯效應消失後）之間的嗎啡使用總量也有不同，最小均方差為11.17mg（95%可信區間：24.2至－9.93，P = 0.013）。ITT分析類似於PP分析結果。功能結果顯示在術後第2天，內收肌管導管組患者有更佳的股四頭肌力量（P = 0.010）和更遠的走動距離（P = 0.034）。
BACKGROUND: Adductor canal blocks have shown promise in reducing postoperative pain in total knee arthroplasty patients. No randomized, controlled studies, however, evaluate the opioid-sparing benefits of a continuous 0.2% ropivacaine infusion at the adductor canal. We hypothesized that a continuous adductor canal block would decrease postoperative opioid consumption.

METHODS: Eighty subjects presenting for primary unilateral total knee arthroplasty were randomized to receive either a continuous ultrasound-guided adductor canal block with 0.2% ropivacaine or a sham catheter. All subjects received a preoperative single-injection femoral nerve block with spinal anesthesia as is standard of care at our institution. Cumulative IV morphine consumption 48 hours after surgery was evaluated with analysis of covariance, adjusted for baseline characteristics. Secondary outcomes included resting pain scores (numeric rating scale), peak pain scores during physical therapy on postoperative days 1 and 2, quadriceps maximum voluntary isometric contraction, distance ambulated during physical therapy, postoperative nausea and vomiting, and satisfaction with analgesia.

RESULTS: Eighty subjects were randomized, and 76 completed the study per-protocol. The least-square mean difference in cumulative morphine consumption over 48 hours (block − sham) was −16.68 mg (95% confidence interval, −29.78 to −3.59, P = 0.013). Total morphine use between 24 and 48 hours (after predicted femoral nerve block resolution) also differed by least-square mean −11.17 mg (95% confidence interval: −19.93 to −2.42, P = 0.013). Intention-to-treat analysis was similar to the per-protocol results. Functional outcomes revealed subjects in the adductor canal catheter group had better quadriceps strength (P = 0.010) and further distance ambulated (P = 0.034) on postoperative day 2.

CONCLUSIONS: A continuous adductor canal block for total knee arthroplasty reduces opioid consumption compared with that of placebo in the first 48 hours after surgery. Other outcomes including quadriceps strength, distance ambulated, and pain scores all show benefit from an adductor canal catheter after total knee arthroplasty but require further study before being interpreted as conclusive.

The effect of single low-dose dexamethasone on blood glucose concentrations in the perioperative period: a randomized, placebo-controlled investigation in gynecologic surgical patients.

Murphy GS1, Szokol JW, Avram MJ, Greenberg SB, Shear T, Vender JS, Gray J, Landry E.
Anesthesia & Analgesia 2014 118 1204–1212
藥後 8h 和 24h。對於給藥後發生高血糖患者要進行數量統計（高血糖定義為血糖濃度 >180mg/dL）。

結果：所有對照組和試驗組的患者血糖濃度值均在圍手術期出現明顯增高（由血糖基礎值 94mg/dL~102 mg/dL 增高到峰值 141mg/dL~161.5 mg/dL, P < 0.001）。不論給予地塞米松的劑量高低（4mg 或 8mg），在不同時間點測定對照組和試驗組血糖後，結果未出現明顯差異。此外，在早期組和晚期組發生高血糖的發生率也未出現明顯差異（早期組：21%-28%, P = 0.807；晚期組：13%-24%, P = 0.552）。

結論：在圍手術期給予單次低劑量地塞米松後，24 小時內患者血糖濃度並沒有出現明顯差異，故建議臨床麻醉醫生利用地塞米松預防患者噁心嘔吐時，沒有必要顧慮反應性高血糖。

（王嘉興譯 薛張綱校）

BACKGROUND: The effect of single low-dose dexamethasone therapy on perioperative blood glucose concentrations has not been well characterized. In this investigation, we examined the effect of 2 commonly used doses of dexamethasone (4 and 8 mg at induction of anesthesia) on blood glucose concentrations during the first 24 hours after administration.

METHODS: Two hundred women patients were randomized to 1 of 6 groups: Early-control (saline); Early-4 mg (4 mg dexamethasone); Early-8 mg (8 mg dexamethasone); Late-control (saline); Late-4 mg (4 mg dexamethasone); and Late-8 mg (8 mg dexamethasone). Blood glucose concentrations were measured at baseline and 1, 2, 3, and 4 hours after administration in the early groups and at baseline and 8 and 24 hours after administration in the late groups. The incidence of hyperglycemic events (the number of patients with at least 1 blood glucose concentration >180 mg/dL) was determined.

RESULTS: Blood glucose concentrations increased significantly over time in all control and dexamethasone groups (from median baselines of 94 to 102 mg/dL to maximum medians ranging from 141 to 161.5 mg/dL, all P < 0.001). Blood glucose concentrations did not differ significantly between the groups receiving dexamethasone (either 4 or 8 mg) and those receiving saline at any measurement time. The incidence of hyperglycemic events did not differ in any of the early (21%-28%, P = 0.807) or late (13%-24%, P = 0.552) groups.

CONCLUSIONS: Because blood glucose concentrations during the first 24 hours after administration of single low-dose dexamethasone did not differ from those observed after saline administrations, these results suggest clinicians need not avoid using dexamethasone for nausea and vomiting prophylaxis out of concerns related to hyperglycemia.
爭論的原因在於地塞米松是糖皮質激素，用於圍術期的患者時會產生令人擔憂的副作用。這些顧慮包括傷口感染、傷口癒合、圍術期出血、皮質醇抑制、神經肌肉無力、高血糖，甚至腫瘤復發。在本期的 Anesthesia & Analgesia，使用地塞米松的兩個顧慮，類固醇激素除腫瘤復發和圍術期高血糖的關係，都會討論到。

糖皮質激素和它們在腫瘤患者的使用早已是圍術期關注到的話題。手術切除是許多腫瘤的確切治療方法，腫瘤復發和轉移性疾病是腫瘤療程患者死亡最重要的原因。圍術期宿主亂糟糟的抑制，麻醉技術和藥物選擇的影響，會對宿主免疫的功能產生重大的影響。因此，它們對術後免疫恢復的影響，它們都參與了抗腫瘤免疫反應。儘管有這些發現，關於使用皮質醇激素和腫瘤復發的資料很少。

在這個問題上，De Oliveira 等發表了一個回顧性觀察研究，分析了圍手術期使用地塞米松 4~8mg 用於預防術後噁心嘔吐對接受原發性卵巢腫瘤細胞減滅術的婦女對卵巢癌和卵巢癌的復發風險的影響。主要目的是通過對圍手術期接受地塞米松和沒有接受治療的婦女相比較，卵巢癌復發的風險是否增加。在研究納入的 260 例婦女中，178 例癌症復發，這些患者中的 102 例注射過地塞米松。這項研究最終發現地塞米松有用於圍術期地塞米松以預防術後噁心嘔吐的治療，美國麻醉師學會建議使用低劑量地塞米松來預防術後噁心嘔吐。Munstedt 等發現，化療使用地塞米松並不會影響卵巢癌的結果，但可能對骨髓有保護作用。

使用地塞米松經常受到關注的風險是術中和術後的高血糖，有一些以前的研究表明使用糖皮質激素引起暫時的血糖水平的升高。糖皮質激素已知會增加肝糖原的生成，同時增加胰島素抵抗和降低葡萄糖的氧化和攝取。高血糖作的這些用可能與危重和術後病人的不良反應相關，如抑制免疫功能，增加促炎性細胞因子，增加全身血管阻力，滲透性利尿，電解質以及酸稟失衡。

IMurphy 等等解決這個問題進行了一個隨機，安慰劑對照試驗，以確定地塞米松用於婦科手術病人在圍術期對血糖濃度的影響。主要的結果是在給予單次的低劑量地塞米松治療（4 和 8 毫克）後，記錄第一個 24 小時的血糖濃度和高血糖事件的發生率（血糖濃度＞180 毫克/分升）。患者被隨機分為接受生理鹽水，地塞米松 4 毫克，地塞米松 8 mg 三組，在圍手術期 24 小時內的對照組和地塞米松組均顯著增加，但地塞米松組和生理鹽水對照組之間在圍術期 24 小時的空腹時的血糖濃度之間沒有顯著性差異。結論表明，圍術期不應因考慮高血糖事件而避免給予低劑量地塞米松來預防術後的噁心嘔吐。這發現與其它研究中的證據相一致。Abedmalak 等人的一項研究表明，進行重大非心臟手術後，接受地塞米松 8 毫克組與安慰劑組均有較高的血糖水平，不管是糖尿病還是非糖尿病患者，其效果都非常有限的。在另一項類似研究中，Nazar 等調查了 40 例非糖尿病和 30 例 2 型糖尿病患者行腹腔鏡膽囊摘除術的患者。患者被隨機分為生理鹽水組和地塞米松 8 毫克組，結果表明，在使用地塞米松預防術後噁心嘔吐後，2 型糖尿病人患糖尿病的敏感性不比非糖尿病患者高。

我們團隊最近在本雜誌發表了一篇編者按，名為：使用地塞米松預防術後噁心嘔吐和傷口併發症：一個有爭議的問題？我們的結論是，目前的文獻不支持如下觀點：圍術期單次劑量的地塞米松在統計學上顯著增加傷口併發症的發生率和最終傷口癒合時間。這和使用單次劑量地塞米松預防術後噁心嘔吐與腫瘤復發和術中高血糖進行的上述評估，再次表明麻醉醫師能夠安全的使用 4~8mg的地塞米松預防術後噁心嘔吐。

（吳赤譯 薛張綱校）

The routine use of dexamethasone for the prophylaxis of postoperative nausea and vomiting (PONV) has been controversial and debated among anesthesiologists and anesthesia providers.
for many years. Why is this? There are clear data to support that dexamethasone, with its relative low cost and high efficacy, is a preferred antiemetic for the prevention of PONV, as recommended by the PONV Consensus Guidelines. Compared with ondansetron, a 5-HT-3 receptor antagonist, which is likely the most commonly used antiemetic to prevent and treat PONV, the number needed-to-treat to prevent PONV for dexamethasone is 4, compared with 6 to 7 for ondansetron. The ideal prophylactic dosage appears to be 4 mg IV at induction of anesthesia; however, 8 mg IV may provide the additional benefit of pain relief because of opioid-sparing effects as well as shorten recovery time.

The reason for this controversy, of course, is that dexamethasone is a glucocorticoid with many feared side effects when used in the perioperative patient population. There have been concerns regarding the risk of wound infections, wound healing, perioperative bleeding, cortisol suppression, neuromuscular weakness, high blood glucose levels, and even cancer recurrence. In this issue of Anesthesia & Analgesia, 2 concerns of dexamethasone, the association with steroids and the recurrence of cancer, as well as the concern for the induction of perioperative hyperglycemia, are examined.

Glucocorticoids and their use in cancer patients have long been a topic of concern in the perioperative setting. Surgical excision is the primary definitive treatment for many forms of cancer, with tumor recurrence and metastatic disease being the most important cause of mortality in surgical cancer patients. The suppression of host defenses in the perioperative period, as well as the role of anesthetic techniques and drug choices, are becoming increasingly scrutinized regarding their effect on host immunity. Dexamethasone has been shown to suppress T cell function as well as natural killer cell development, both of which are known to participate in antitumor immune responses. Despite these findings, there are few data at this point regarding corticosteroid use and cancer recurrence.

In this issue, De Oliveira et al. present a retrospective observational study that analyzes the effect of perioperative systemic dexamethasone (4–10 mg) for PONV prophylaxis in women who underwent primary ovarian cytoreductive surgery for ovarian cancer and the risk of ovarian cancer recurrence. The primary aim was to determine the overall increase in the risk of ovarian cancer recurrence in these patients by determining tumor recurrence in women given perioperative dexamethasone versus those who did not receive the medication. Of 260 women included in the study, 178 had cancer recurrence; 102 of these patients received dexamethasone. The study ultimately found no significant association between perioperative dexamethasone use and ovarian cancer recurrence after primary surgical treatment and therefore does not support the avoidance of single-dose dexamethasone for PONV prophylaxis. There are some acknowledged weaknesses to the study, such as a small sample size and a lack of standardization of intraoperative and postoperative analgesic management. This is particularly important in that several studies have suggested that the use of opioids in the perioperative setting may have an effect on angiogenesis and cancer outcomes. Opioids have been found to regulate the growth of neoplastic cells through the modulation of cell proliferation and apoptosis; they cause immunosuppression, as well as modulate angiogenesis, aiding tumor metastasis and growth through activation of vascular growth cell receptors such as vascular endothelial growth factor and platelet derived growth factor. Another study presented evidence that opioids may have a direct effect on lung cancer progression through interaction with the µ-opioid receptor. In cancer recurrence from single-dose dexamethasone, there is no clinical evidence in the literature to refute the above findings. In fact, Egberts et al. created an animal model in which dexamethasone had utility in preventing the recurrence and metastasis of pancreatic cancer. A study by Munstedt et al. found that dexamethasone used along with chemotherapy did not affect ovarian cancer outcomes but may have protective effects on bone marrow.

Another often-touted risk of dexamethasone use is the concern for intraoperative and postoperative hyperglycemia, with several previous studies demonstrating a transient rise in glucose levels with the use of glucocorticoids. Glucocorticoids are known to increase hepatic glucose production, while increasing insulin resistance and decreasing glucose oxidation and
uptake. These hyperglycemic effects may be associated with adverse outcomes in the critically ill and postsurgical patients, such as suppression of immune function, increase in proinflammatory cytokines, increased systemic vascular resistance, osmotic diuresis, and electrolyte as well as acid–base imbalances.

Murphy et al. address this concern in this issue with a randomized, placebo-controlled trial to address the effect of dexamethasone on blood glucose concentration in the perioperative environment for gynecologic surgical patients. The primary outcome was to determine the effect of a single low-dose dexamethasone therapy (4 and 8 mg) on blood glucose concentrations during the first 24 hours following administration and to record the incidence of hyperglycemic events (blood glucose level >180 mg/dL). Patients presenting for elective hysterectomies were randomized to receive saline, dexamethasone 4 mg, or dexamethasone 8 mg, with blood glucose measurements at specified times for each group within a 24-hour perioperative period. The study found that while blood glucose concentrations increased significantly in all control and dexamethasone groups, they did not differ significantly between the dexamethasone and saline control groups at any time within the 24-hour perioperative period. Therefore, the results suggest that low-dose dexamethasone used for PONV prophylaxis should not be avoided because of concerns for hyperglycemic events. This finding is supported by other evidence in the literature. One study by Abdelmalak et al. showed that while patients undergoing major noncardiac surgery had higher blood glucose levels after receiving dexamethasone 8 mg versus placebo, the effect was very limited in both diabetic and nondiabetic patients. A similar study by Nazar et al. investigated a group of 40 nondiabetic and 30 type-2 diabetic patients undergoing laparoscopic cholecystectomy. Patients were randomized to receive either saline or dexamethasone 8 mg, and the results showed that there was no higher susceptibility in the type-2 diabetic patients than the nondiabetic patients to develop perioperative hyperglycemia following PONV doses of dexamethasone.

Our group recently wrote an editorial in this journal with the title: Wound complications with dexamethasone for postoperative nausea and vomiting prophylaxis: a moot point? We concluded that the current literature does not support the concern that single-dose use of intraoperative dexamethasone contributes to a statistically significant increase in the incidence of wound complications or time to complete wound healing. This, along with the above evaluations of the concerns of the use of single-dose dexamethasone for PONV and the recurrence of cancer or intraoperative hyperglycemia, suggest again that anesthesiologists can safely use dexamethasone 4 to 8 mg doses for PONV prophylaxis.

心臟外科病人中輸注儲存的同種異體血而非自體血回收後損傷紅細胞的可塑性

Impaired Red Blood Cell Deformability after Transfusion of Stored Allogeneic Blood but Not Autologous Salvaged Blood in Cardiac Surgery Patients

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背景：心肺轉流和紅細胞長時間的儲存都與紅細胞結構、功能的損害性改變密切相關，進而影響組織氧運輸。我們假設，在心外科病人中，紅細胞的可塑性和聚集性受自體血回收的單一影響很小，但同種異體血輸注起負面影響。

方法：在這項前瞻性佇列研究中，32 位內科病人根據輸血方式分為 3 組：單獨輸注自體血紅細胞組（Auto, n=12），輸注自體血紅細胞和少量（<5 單位）同種異體血紅細胞組(Auto+Allo min; n=10)，和輸注自體血紅細胞與中等量（>5 單位）同種異體血紅細胞(Auto+Allo mod; n=10)。在術前、術中和術後 3 天分別利用鐳射衍射法檢測紅細胞的伸長指數（可塑性）和臨界剪切應力（聚集性）。
RESULTS: In the Auto group, RBC elongation index did not change significantly from the preoperative baseline. In the Auto+Allo min group, mean elongation index decreased from 32.31 ± 0.02 (baseline) to 30.47 ± 0.02 (nadir on postoperative day 1) (P = 0.003, representing a 6% change). In the Auto+Allo mod group, mean elongation index decreased from 32.7 ± 0.02 (baseline) to 28.14 ± 0.01 (nadir on postoperative day 1) (P = 0.0001, representing a 14% change). Deformability then dose-dependently recovered toward baseline over the first 3 postoperative days. Changes in aggregation were unrelated to transfusion (no difference among groups). For the 3 groups combined, mean critical shear stress decreased from 359 ± 174 mPa to 170 ± 141 mPa (P = 0.01, representing a 54% change), with the nadir at the end of surgery and returned to baseline by postoperative day 1.

CONCLUSIONS: In cardiac surgery patients, transfusion with stored allogeneic RBCs, but not autologous salvaged RBCs, is associated with a decrease in RBC cell membrane deformability that is dose-dependent and may persist beyond 3 postoperative days. These findings suggest that autologous salvaged RBCs may be of higher quality than stored RBCs, since the latter are subject to the so-called storage lesions.

合成大麻素 Ajulemic 酸對電壓門控鈉通道的阻滯

Inhibition of Voltage-Gated Na+ Channels by the Synthetic Cannabinoid Ajulemic Acid

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背景：合成大麻素 ajulemic 酸已被證實可以緩解患者慢性神經性疼痛。大麻素可與疼痛機制環路中數個分子相互作用，包括對電壓門控鈉通道的強效抑制作用。在本研究中，我們在神經細胞及非神經細胞鈉通道中深入研究了這個特性。
方法：我們在體外研究了 ajulemic 酸對於內向鈉離子電流的抑制作用。人胚胎腎 293t 細胞用於 Nav1.2, 1.3, 1.4, 1.5, 1.5N406K, 1.5F1760A 及 1.7 的表達系統。Nav1.8 僅短暫表達於 ND7/23 細胞中。Nav1.2, Nav1.3 及 Nav 1.8 來源於大鼠，Nav1.4, Nav1.5 及 Nav1.7 則來源於人。應用全細胞膜片鉗技術進行鈉離子電流的分析。研究中使用的 ajulemic 酸的濃度分別為 0.1, 0.3, 1, 3, 10 和 30 μmol/L。

結果：Ajulemic 酸濃度依賴性的可逆的抑制研究中觀察的所有亞型的電壓門控鈉離子通道（Nav），包括 Nav1.2, 1.3, 1.4, 1.5, 1.7 和 1.8。對靜息通道產生半數最大緊張性阻滯的濃度值在 2 到 9 μmol/L 之間，並且在失活通道中的阻滯作用增強，提示 ajulemic 酸的鈉通道阻滯作用依賴於通道所處的功能狀態。緊張性阻滯在分別在通道 Nav1.2 和 Nav1.3, Nav1.4 和 Nav1.5, 以及 Nav1.7 和 Nav1.8 的對比中並無顯著性差異。通過方差分析對其它亞型組合（比如 Nav1.2 和 Nav1.4）的阻滯進行的統計分析結果差異有顯著統計學意義。雖然我們並未研究任何相關的功能依賴性的阻滯，ajulemic 酸可引起電壓依賴通道快速失活的強烈的超級化改變，以及緩慢失活的語音超級化改變。對局麻藥不敏感的 Nav1.5 構成 N406K 及 F1760A，對 ajulemic 酸的阻滯作用表現出內在的敏感性。最後，我們發現低濃度的 ajulemic 酸可有效抑制 Nav1.5 中由 Navβ4 肽段介導的再生電流。

結論：我們的研究資料表明 ajulemic 酸可能通過阻滯鈉離子通道的相關機制來緩解神經性疼痛。對於再生電流的強效的阻滯作用以及對局麻藥不敏感通道的內在阻滯表明 ajulemic 酸與一些尚未被知曉的鈉通道位點相互作用。

(杜芳譯 薛張綱校)

BACKGROUND：The synthetic cannabinoid ajulemic acid has been demonstrated to alleviate pain in patients suffering from chronic neuropathic pain. Cannabinoids interact with several molecules within the pain circuit, including a potent inhibition of voltage-gated sodium channels. In this study, we closely characterized this property on neuronal and nonneuronal sodium channels.

METHODS: The inhibition of sodium inward currents by ajulemic acid was studied in vitro. Human embryonic kidney 293t cells were used as the expression system for Nav1.2, 1.3, 1.4, 1.5, 1.5N406K, 1.5F1760A, and 1.7; Nav1.8 was transiently expressed in ND7/23 cells. Nav1.2, Nav1.3, and Nav 1.8 were from rats, and Nav1.4, Nav1.5, and Nav1.7 were of human origin. Sodium currents were analyzed by means of the whole cell patch-clamp technique. The investigated concentrations of ajulemic acid were 0.1, 0.3, 1, 3, 10, and 30 μmol/L.

RESULTS: Ajulemic acid reversibly and concentration-dependently inhibited all voltage-gated sodium channel (Nav) isoforms investigated in this study, including Nav1.2, 1.3, 1.4, 1.5, 1.7, and 1.8. Tonic block of resting channels yielded half-maximal inhibitory concentration values between 2 and 9 μmol/L and was strongly enhanced on inactivated channels, suggesting state-dependent inhibition by ajulemic acid. Tonic block did not differ significantly when comparing Nav1.2 and Nav1.3, Nav1.4 and Nav1.5, and Nav1.7 and Nav1.8. Statistical analysis of other combinations of subunits (e.g., Nav1.2 and Nav1.4) by analysis of variance yielded a significant difference in block. Although we did not observe any relevant use-dependent block, ajulemic acid induced a strong hyperpolarizing shift of the voltage dependency of fast inactivation and modest shift of slow inactivation. The local anesthetic-insensitive Nav1.5 constructs N406K and F1760A displayed a preserved sensitivity to block by ajulemic acid. Finally, we found that low concentrations of ajulemic acid efficiently inhibited Navβ4 peptide-mediated resurgent currents in Nav1.5.

CONCLUSIONS: Our data suggest that block of sodium channels can be a relevant mechanism by which ajulemic acid alleviates neuropathic pain. The potent inhibition of resurgent currents and the preserved block on local anesthetic-insensitive channels indicates that ajulemic acid interacts with a conserved but yet unknown site of sodium channels.
Is Video Laryngoscope-Assisted Flexible Tracheoscope Intubation Feasible for Patients with Predicted Difficult Airway? A Prospective, Randomized Clinical Trial

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BACKGROUND: Failed intubation may result in both increased morbidity and mortality. The combination of a video laryngoscope and a flexible tracheoscope used as a flexible video stylet may improve the success rate of securing a difficult airway. We tested the hypothesis that this combination is a feasible way to facilitate intubation in patients with a predicted difficult airway in that it will shorten intubation times and reduce the number of intubation attempts.

METHODS: We conducted a randomized, prospective trial in 140 patients with anticipated difficult airways undergoing elective or urgent surgery. After insertion of video laryngoscope, patients were randomly assigned to either having their tube placed with the use of a preformed stylet (control group) or with a flexible tracheoscope (intervention group). The primary outcome measures were time to successful intubation and number of intubation attempts.

RESULTS: The number of intubations requiring 2 or more intubation attempts was similar in the 2 groups (14% control vs 13% intervention, P = 1.0); the number of patients requiring 3 or more intubation attempts was not significantly different (8.6% control vs 1.4% intervention, P = 0.12). Distribution for time to intubation also did not differ between the control (median of 66 seconds, interquartile range 47–89) and the intervention group (median of 71 seconds, interquartile range 52–100; P = 0.35). In the control group, 4 patients, all with cervical spine pathology, had the trachea intubated successfully with the video laryngoscope plus flexible tracheoscope after 3 failed attempts with video laryngoscope and rigid stylet. For these 4 patients, time from the decision to change the intubation method to successful intubation with a flexible tracheoscope was 36 ± 14 seconds. Overall success probability for cervical spine patients was

 Background: 插管失敗有可能會增加患者的發病率和死亡率。可視喉鏡聯合可彎曲氣管鏡相當於一個可彎曲的可視管芯，可以提高困難氣道插管的成功率。我們通過研究檢驗了這種組合方法，發現這不僅易化了預測為困難氣道的患者的氣管插管，還可以縮短插管時間、減少插管嘗試次數。

Methods: 我們隨機、前瞻性地對140例行擇期或急診手術預期為困難氣道的患者進行了試驗。插入可視喉鏡後，患者被隨機分配到放置預成型管芯組（對照組）或可彎曲氣管鏡組（干預組）。研究主要觀察的指標是插管成功的时间和氣管插管嘗試的次數。

Results: 研究表明兩組間需要2次或以上嘗試插管次數的患者人數相似（對照組為14%，干預組為13%，P = 1.0）；兩組間需要3次或以上嘗試插管次數的患者人數沒有顯著差異（對照組為8.6%，干預組為1.4%，P = 0.12）。兩組間插管時間的分佈曲線也沒有明顯差異（對照組：中位數為66秒，四分位數間距47–89秒；干預組：中位數為71秒，四分位數間距52–100秒，P = 0.12）。在對照組中，4例頸椎病患，在使用可視喉鏡和硬質管芯嘗試插管失敗3次後，採用可視喉鏡聯合可彎曲氣管鏡插管成功。對於這4例患者，從決定改變插管方法至可彎曲氣管鏡成功插管用時為36±14秒。干預組中頸椎患者插管的總體成功概率為100%（20/20），而對照組為80%（16/20），95%置信區間分別為1.4%和44%，P = 0.04。

Conclusion: 對於預測為困難氣道的患者，可彎曲氣管鏡輔助可視喉鏡插管是僅使用可視喉鏡的一個可行的替代方案。可彎曲氣管鏡聯合可視喉鏡還可能進一步增加明確有困難氣道的擇期手術患者氣管插管的成功率，特別是當需要保持線性穩定時。

（江淩慧譯 薛張綱校）
100% (20/20) in the intervention group and 80% (16/20) in the control group, with an exact 95% confidence interval for the difference of 1.4% to 44%, \( P = 0.04 \).

**CONCLUSIONS:** Flexible tracheoscope-assisted video laryngoscopic intubation is a feasible alternative to video laryngoscope only intubation in patients with predicted difficult airways. A flexible tracheoscope used in combination with video laryngoscope may also further increase the success rate of intubation in select patients with a proven difficult airway, particularly when in-line stabilization is required.

**Perceptions about bloodtransfusion: a survey of surgical patients and their anesthesiologists and surgeons.**

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those adverse events. Group differences were evaluated with conventional inferential biostatistics.

RESULTS: A total of 294 patients and 73 physicians completed the surveys. Among the surveyed patients, 20% (95% confidence interval, 15%-25%) perceived blood transfusions as "very often risky" or "always risky." Greater perceived overall bloodtransfusion risk was associated with African American race (P = 0.028) and having a high school or less level of education (P = 0.022). Greater perceived risk of allergic reaction (P = 0.001), fever (P < 0.001), and dyspnea (P = 0.001) were associated with African American race. Greater perceived risk of allergic reaction (P = 0.009), fever (P = 0.039), dyspnea (P = 0.004), human immunodeficiency virus/acquired immune deficiency syndrome and hepatitis (P = 0.003), and medical error (P = 0.039) were associated with having a high school or less level of education. Patients and physicians also differed significantly in their survey responses, with physicians reporting greater overall perceived risk with a bloodtransfusion (P = 0.001).

CONCLUSIONS: Despite improvements in bloodtransfusion safety in the United States and other developed countries, the results of this study indicate that a sizeable percentage of patients still perceive transfusion as having significant associated risk. Furthermore, patients and their anesthesiologists/surgeons differ in their perceptions about transfusion-related risks and complications. Understanding patients' perceptions of bloodtransfusion and identifying groups with the greater specific concerns will better enable health care professionals to address risk during the informed consent process and recommend blood management in accordance with the individual patient's values, beliefs, and fears or concerns.
strategies. Our goal was to determine whether direct injection of BoNT-A into painful muscle groups is effective for cervical and shoulder girdle myofascial pain.

**METHODS:** An enriched protocol design was used, wherein 114 patients with cervical and shoulder girdle myofascial pain underwent injection of BoNT-A to determine their response to the drug. Fifty-four responders were then enrolled in a 12-week, randomized, double-blind, placebo-controlled trial. Pain scales and quality of life measures were assessed at baseline and at routine follow-up visits until completion of the study after 26 weeks.

**RESULTS:** Injection of BoNT-A into painful muscle groups improved average visual numerical pain scores in subjects who received a second dose of BoNT-A compared to placebo (P = 0.019 [0.26, 2.78]). Subjects who received a second dose of BoNT-A had a reduced number of headaches per week (P = 0.04 [0.07, 4.55]). Brief Pain Inventory interference scores for general activity and sleep were improved (P = 0.046 [0.038, 3.700] and 0.02 [0.37, 4.33], respectively) in those who received a second dose of BoNT-A.

**CONCLUSION:** BoNT-A injected directly into painful muscle groups improves average pain scores and certain aspects of quality of life in patients experiencing severe cervical and shoulder girdle myofascial pain.

背景：我們研究聯合靜脈注射含羅呱卡因的有磁性的納米顆粒及踝部磁性導向進行鼠踝關節阻滯作為目前局部神經阻滯的替代方法的可行性。

**方法**：我們通過測量鼠足部對熱刺激的撤藥潛伏期來觀察磁性導向的含羅呱卡因的磁性納米顆粒的麻醉效果。含羅呱卡因的磁性納米顆粒複合體由 0.7% 羅呱卡因（重量/容積）和含 12% 磁性物質（Fe3O4，重量/重量）的 0.8% 磁性納米顆粒（重量/容積）構成。我們在注射該複合體 15、30 及 60min 時對有磁性導向的右足及沒有磁性導向的左足及傳統應用 0.1% 或 0.2% 羅呱卡因進行的踝關節阻滯進行比較，並在 30min 時對單純注射該複合體的右足與聯合磁性導向的右足進行比較。另外，我們還測定了含羅呱卡因的磁性納米顆粒複合體的藥代動力學。

**結果**：與經過預處理的同側足及沒有磁性導向的對側足掌相比較，靜脈注射含羅呱卡因的磁性納米顆粒聯合足部磁性導向可顯著增加足掌對熱刺激的撤藥潛伏期（P < 0.0001）。磁性導向 30min 後踝部組織羅呱卡因絕對濃度及踝部組織/血漿濃度比例均高於單純注射含羅呱卡因的磁性納米顆粒複合體（均值 ± 標準差，150 ± 10 ng/g vs 105 ± 15 ng/g 及 6.1 ± 0.8 vs 4.2 ± 0.7）。

**結論**：我們的研究表明通過靜脈注射含羅呱卡因的磁性納米顆粒複合體聯合踝部磁性導向進行踝關節阻滯是可行的，並推薦對該方法進行深入研究。

（郝光偉譯 薛張綱校）

**BACKGROUND:** As an alternative to current methods of local nerve block, we studied the feasibility of producing ankle block in the rat with IV injection of magnetic nanoparticles (MNPs) associated with ropivacaine and application of a magnet at the ankle.
METHODS: The anesthetic effect of magnet-directed ropivacaine-associated MNPs (MNP/Ropiv) was tested in the rat using paw withdrawal latencies from thermal stimuli applied to the hindpaw. The MNP/Ropiv complexes consisted of 0.7% w/v ropivacaine and 0.8% w/v MNPs containing 12% w/w magnetite (Fe3O4). The effect of IV injection of MNP/Ropiv with 15, 30, and 60-minute magnet application to the right ankle was compared with the effect without magnet application on the left hindpaw, to conventional ankle block with 0.1% or 0.2% ropivacaine, and to IV injection of MNPs alone with 30-minute magnet application to the right ankle. In addition, the pharmacokinetics of the MNP/Ropiv complexes were determined.

RESULTS: IV injection of MNP/Ropiv with magnet application at the ankle significantly increased paw withdrawal latencies from thermal stimuli compared with pretreatment baselines in the same paw (P < 0.0001) and compared with the contralateral paw without magnet application (P < 0.0001). IV injection of MNPs alone had no significant effect on paw withdrawal latency. Absolute ropivacaine concentrations in ankle tissue, and ankle tissue-to-plasma concentration ratios were higher in the MNP/Ropiv group with 30-minute magnet application compared with MNP/Ropiv group without magnet application (mean ± SEM, 150 ± 10 ng/g vs 105 ± 15 ng/g, respectively, and 6.1 ± 0.8 vs 4.2 ± 0.7, respectively).

CONCLUSIONS: The current study establishes proof of principle that it is possible to produce ankle block in the rat by IV injection of MNP/Ropiv complexes and magnet application at the ankle. The results indicate that further study of this approach is warranted.
BACKGROUND: Basic science studies suggest that perioperative immune impairment may augment the risk of cancer recurrence after otherwise potentially curative surgery. Despite its immunosuppressant properties, dexamethasone is commonly given to oncologic patients in an effort to reduce postoperative nausea and vomiting. We therefore tested the hypothesis that perioperative dexamethasone administration increases the risk of ovarian cancer recurrence.

METHODS: Women who had primary ovarian cytoreductive surgery between January 1997 and October 2007 were identified using a database maintained by the division of Gynecologic Oncology at Northwestern University. Tumor recurrence in women given perioperative systemic dexamethasone (4-10 mg) was compared with those who did not receive dexamethasone. The primary outcome was the propensity-matched time to cancer recurrence. Recurrence was defined by a carcinoantigen 125 >21 U/mL or computerized tomography evidence of the disease followed by tissue confirmation. Median difference and 95% confidence interval between the propensity-matched groups were calculated using a 10,000 sample bootstrap.

RESULTS: Among 260 women having primary cytoreductive surgery for ovarian cancer that met our inclusion criteria, 102 subjects were given perioperative systemic dexamethasone. Cancer recurrence was observed in 178 subjects, and the overall unadjusted median (IQR) time to recurrence was 18 (7-50) months. Eighty-seven cases and 87 controls were propensity matched to adjust for confounding covariates. After propensity matching the groups for confounding covariates, the median (IQR) time to recurrence in the dexamethasone group was 23 (6-46) compared with 18 (8-53) months in the control group (P = 0.63) with a median (95% confidence interval) difference of time to recurrence between the dexamethasone and the control group of 5 (-8 to 17) months.

CONCLUSION: We could not find evidence for an association between perioperative systemic dexamethasone administration and ovarian cancer recurrence after primary cytoreductive surgery. Our results do not support avoiding low-dose perioperative dexamethasone for prevention of postoperative nausea, vomiting, and pain in ovarian cancer patients.
Subclinical Carbon Monoxide Limits Apoptosis in the Developing Brain After Isoflurane Exposure

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Anesthesia & Analgesia 2014 118 1284–1292

BACKGROUND: Volatile anesthetics cause widespread apoptosis in the developing brain. Carbon monoxide (CO) has antiapoptotic properties, and exhaled endogenous CO is commonly rebreathed during low-flow anesthesia in infants and children, resulting in subclinical CO exposure. Thus, we aimed to determine whether CO could limit isoflurane-induced apoptosis in the developing brain.

METHODS: Seven-day-old male CD-1 mouse pups underwent 1-hour exposure to 0 (air), 5, or 100 ppm CO in air with or without isoflurane (2%). We assessed carboxyhemoglobin levels, cytochrome c peroxidase activity, and cytochrome c release from forebrain mitochondria after exposure and quantified the number of activated caspase-3 positive cells and TUNEL positive nuclei in neocortex, hippocampus, and hypothalamus/thalamus.

RESULTS: Carboxyhemoglobin levels approximated those expected in humans after a similar time-weighted CO exposure. Isoflurane significantly increased cytochrome c peroxidase activity, cytochrome c release, the number of activated caspase-3 cells, and TUNEL positive nuclei in the forebrain of air-exposed mice. CO, however, abrogated isoflurane-induced cytochrome c peroxidase activation and cytochrome c release from forebrain mitochondria and decreased the number of activated caspase-3 positive cells and TUNEL positive nuclei after simultaneous exposure with isoflurane.

CONCLUSIONS: Taken together, the data indicate that CO can limit apoptosis after isoflurane exposure via inhibition of cytochrome c peroxidase depending on concentration. Although it is unknown whether CO directly inhibited isoflurane-induced apoptosis, it is possible that low-flow anesthesia designed to target rebreathing of specific concentrations of CO may be a desired strategy to develop in the future in an effort to prevent anesthesia-induced neurotoxicity in infants and children.
經食道超聲心動圖在Mitraclip術的應用

Transesophageal Echocardiography During MitraClip® Procedure

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經皮二尖瓣 (MV) 修補程式與MitraClip輸送系統越來越多地被用於治療高危重度二尖瓣返流。治療過程包括經皮插入和MV傳單之間夾定位。經食管超聲（TEE）起著關鍵的作用，在過程中提供關於夾導航資訊，對MV接合線夾定位，系統的把握，單張二尖瓣進步，閥門組織捕捉確認，和最終結果的評價。即時三維 TEE 在經皮二尖瓣修復提供了兩個心臟和血管內裝置的高品質的視覺化圖像。通過三維 TEE 最佳的視覺化是通過兩個心房和心室方面獲得的。在MV外科手術中，TEE用於置換前的評估。而在MitraClip修復過程中必須要TEE的指導。心臟麻醉醫師在手術中除了實施麻醉，還可以為介入心臟病學家提供更多的幫助用於指導MV修復。

（王曉莉譯,李士通審校）

The percutaneous mitral valve (MV) repair procedure performed with the MitraClip delivery system is increasingly used to treat severe mitral regurgitation in high-risk patients. The treatment involves percutaneous insertion and positioning of a clip between the MV leaflets. Transesophageal echocardiography (TEE) plays a key role in the procedure by providing information regarding clip navigation, clip alignment to the MV coaptation line, transmitral advancement of the system, leaflet grasping, confirmation of valve tissue catching, and assessment of the final result. Real-time 3-dimensional TEE has increasing value in percutaneous MV repair providing high-quality visualization of both the heart and the intravascular devices. Optimal visualization by 3-dimensional TEE is obtained through both the atrial and ventricular aspects. In contrast to MV surgery, where TEE is involved in the prebypass assessment phase and in evaluation of the final repair, TEE is mandatory to guide management during MitraClip repair. Cardiac anesthesiologists may provide assistance to interventional cardiologists during the procedure itself in addition to their anesthetic-related tasks.

通過多感官知覺訓練來提高麻醉醫生對氧飽和度聲響變化的敏感度

Improving Pulse Oximetry Pitch Perception with Multisensory Perceptual Training.

Schlesinger, Joseph J. MD; Stevenson, Ryan A. PhD; Shotwell, Matthew S. PhD; Wallace, Mark T. PhD

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為了提高患者的術中安全，脈搏氧飽和度已成為臨床麻醉中的常規監測項目。在這裡，我們給大家介紹一個視聽訓練課程，通過這個訓練，麻醉醫生可提升對指脈氧飽和度的監控能力。在知覺訓練之前和之後，我們分別對15個麻醉科住院醫師的聽覺能力（通過感知氧飽和度音響變化來判斷氧飽和度的變化）進行了測試。結果顯示，在類比的類似於手術室的噪雜環境中，訓練之後麻醉醫生判斷氧飽和度變化的準確性提高了9%（95% 的可信區間，4%-14%，P = 0.0004, t166 = 3.60）；判斷的時間快了72毫秒（95% 的可信區間，40-103毫秒, P < 0.0001, t166 = -4.52）。本研究闡明了多感官知覺訓練的有益之處，從而為臨床更好地定義多感官知覺訓練奠定了基礎。

（王慧娟譯 李士通審校）
The pulse oximeter is a critical monitor in anesthesia practice designed to improve patient safety. Here, we present an approach to improve the ability of anesthesiologists to monitor arterial oxygen saturation via pulse oximetry through an audiovisual training process. Fifteen residents' abilities to detect auditory changes in pulse oximetry were measured before and after perceptual training. Training resulted in a 9% (95% confidence interval, 4%-14%, P = 0.0004, t166 = 3.60) increase in detection accuracy, and a 72-millisecond (95% confidence interval, 40-103 milliseconds, P < 0.0001, t166 = -4.52) speeding of response times in attentionally demanding and noisy conditions that were designed to simulate an operating room. This study illustrates the benefits of multisensory training and sets the stage for further work to better define the role of perceptual training in clinical anesthesiology.

一項利用核磁共振成像技術反應口服營養補充劑和口服補液溶液對胃排空及糖原負荷影響的交叉研究

The Effects on Gastric Emptying and Carbohydrate Loading of an Oral Nutritional Supplement and an Oral Rehydration Solution: A Crossover Study with Magnetic Resonance Imaging

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Background: Preoperative administration of clear fluids by mouth has recently been endorsed as a way to improve postoperative outcomes. A carbohydrate-containing beverage supplemented with electrolytes or proteins may have additional benefits for patients' satisfaction. However, effects on gastric residual, nausea, and emesis and the effectiveness of these beverages for improving patients' hydration status have not been well defined.

Methods: We evaluated changes in gastric volume over time by magnetic resonance imaging, as well as blood glucose levels, before and after administration of 500 mL oral rehydration solution (ORS) containing 1.8% glucose and electrolytes in 10 healthy volunteers. The same volume of an oral nutritional supplement (ONS) containing 18% glucose and supplemental arginine (545 mOsm/kg) was given to the same population using a crossover design.
RESULTS: The mean (median, 95% confidence interval) gastric fluid volume at 1 hour after oral ingestion was 55.0 (55.3, 39.0-70.9) mL in the ORS group, whereas 409.2 (410.9, 371.4-447.0) mL in the ONS group (P = 0.0002). The gastric fluid volume of all participants in the ORS group returned to <1 mL/kg at 90 minutes after ingestion, whereas none reached <1 mL/kg at 120 minutes in the ONS group. The ONS group showed a sustained increase in the blood glucose level after ingestion (P < 0.0001 to baseline at 30, 60, 120 minutes), while the ORS group showed an initial increase (P < 0.0001, P = 0.01, P = 0.205 at each time point).

CONCLUSIONS: ORS supplemented with a small amount of glucose showed faster gastric emptying, which may make it suitable for preoperative administration. In contrast, ONS supplemented with arginine with a relatively low osmolality was associated with a longer time for gastric emptying, although it showed a sustained increase in blood glucose level.

BACKGROUND: Associations between anesthetic management and cancer recurrence or long-time survival remain uncertain. In this study, we compared the effects of postoperative epidural morphine analgesia with that of postoperative IV fentanyl analgesia on cancer recurrence and long-term survival in patients undergoing resection of hepatocellular carcinoma.

METHODS: A retrospective cohort study was performed on patients with hepatocellular carcinoma receiving hepatic resection at this institution (n = 1846, 1997-2007). Recurrence-free survival and long-term survival were assessed using Kaplan-Meier survival estimates and compared using a multivariate Cox proportional hazards regression, adjusted with propensity scores.

RESULTS: Eight hundred nineteen patients met the inclusion criteria and were divided into 2 groups: patients receiving postoperative epidural analgesia with morphine (EA, n = 451) and
patients receiving postoperative IV analgesia with fentanyl (IA, n = 368). The median time of follow-up for all patients was 4.2 years (2-9). The rates of recurrence of cancer (37.7% vs 30.7%, P = 0.036) and death (40.6% vs 30.4%, P = 0.003) were higher in the EA group versus IA group. Recurrence-free survival was similar in both the EA and IA groups (hazards ratio 2.224, 95% confidence interval, 0.207-23.893, P = 0.509). Using a multivariate Cox proportional hazards regression adjusted with propensity scores, independent risk factors for long-term survival in patients after resection of hepatocellular carcinoma were ASA physical status, tumor diameter, preoperative α-fetoprotein (+) as well as postoperative epidural analgesia with morphine.

**CONCLUSION:** Compared with postoperative IV analgesia with fentanyl, postoperative epidural analgesia with morphine was associated with increased cancer recurrence and death but had no significant effect on recurrence-free survival in patients undergoing resection of hepatocellular carcinoma.

**Curcumin Treatment Attenuates Pain and Enhances Functional Recovery after Incision**

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Anesthesia & Analgesia 2014 118 1336–1344

**BACKGROUND:** Acute pain after surgery remains moderate to severe for 20% to 30% of patients despite advancements in the use of opioids, adjuvant drugs, and regional anesthesia. Depending on the type of surgery, 10% to 50% of patients experience persistent pain postoperatively, and there are no established methods for its prevention. Curcumin (diferuloylmethane) is one of the phenolic constituents of turmeric that has been used in Eastern traditional medicine as an antiseptic, antioxidant, anti-inflammatory, and analgesic agent. It may be effective for treating postoperative pain.

**METHODS:** We used the hindpaw incision model with C57BL/6 mice. Sensitization to mechanical and thermal stimuli as well as effects on edema and temperature were measured up
RESULTS: Curcumin (50 mg/kg) significantly reduced the intensity of mechanical and heat sensitization after hindpaw incision in mice. No effects of curcumin on baseline nociceptive thresholds were observed. Curcumin also reduced hindpaw swelling after incision, suggesting an anti-inflammatory effect. In addition, perioperative curcumin treatment attenuated hyperalgesic priming due to incision when mice were subsequently challenged with hindpaw prostaglandin E2 application. Furthermore, while vehicle-treated mice had evidence of spontaneous pain 48 hours after incision in the CPP paradigm, no evidence of ongoing pain was observed in the mice treated with curcumin. Likewise, hindpaw incision caused changes in several gait-related indices, but most of these were normalized in the curcumin-treated animals. The peri-incisional levels of several pronociceptive immune mediators including interleukin (IL)-1β, IL-6, tumor necrosis factor α, and macrophage inflammatory protein-1α were either not reduced or were even augmented 1 and 3 days after incision in curcumin-treated mice. The anti-inflammatory cytokine IL-10 was unchanged, while transforming growth factor-β levels were enhanced under the same conditions.

CONCLUSIONS: Our studies suggest that curcumin treatment is effective in alleviating incision-induced inflammation, nociceptive sensitization, spontaneous pain, and functional gait abnormalities. Augmented transforming growth factor-β production provides one possible mechanism. These preclinical findings demonstrate curcumin’s potential as a preventative strategy in postoperative pain treatment.

隨機對照比較雙注射法和定向叢內注射法超聲引導下鎖骨上臂叢神經阻滯

A randomized comparison between double-injection and targeted intracluster-injection ultrasound-guided supravacular brachial plexus block.

Techasuk, Wallaya MD; González, Andrea P. MD; Bernucci, Francisca MD; Cupido, Tracy DO, FRCPC; Finlayson, Roderick J. MD, FRCPC; Tran, De QH MD, FRCPC

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背景：在這項前瞻性、隨機、觀察者盲法的研究中，我們比較了雙注射法（DI）超聲引導下鎖骨上臂叢神經阻滯和新的定向叢內注射法技術（TII），這項技術是將局麻藥注射在神經束及其周圍內（臂叢神經幹和分支的匯集處）。

方法：90個病人隨機分為兩組：DI 和 TII，每組45人，分別接受超聲引導下鎖骨上臂叢神經阻滯。所有病人局麻藥均採用1.5%利多卡因配伍5 μg/ml腎上腺素，用量均為32ml。兩組病人都注射半量局麻藥（16 ml）至主要的神經叢內，在 DI 組，另外半量局麻藥注射在第一肋和鎖骨下動脈交叉處，在 TII 組，餘下半量局麻藥等量注射到每個神經節。結果根據總的麻醉相關時間評估（總的操作時間和起效時間）。

結果：與 DI 組相比，TII 組麻醉起效時間更快（均數±標準差：10.1 ± 6.4 vs 18.5 ± 8.3 minutes; P < 0.0001），總的麻醉時間也更短（21.2 ± 7.7 vs 27.7 ± 9.0 minutes; P = 0.001，95%置信區間為2.90-10.08 minutes）。TII 組沒有失敗病例，DI 組有三例失敗。因此兩組具有一定可比性。神經阻滯相關疼痛評分和不良反應事件在兩組均沒有組內差異。與 TII 組相比，DI 組需要更少的穿刺途徑（均數±四分位元距：4 ± 2 vs 7 ± 3; P < 0.0001）和更短的穿刺時間（8.4 ± 2.9 vs 10.7 ± 2.7 minutes 以及操作時間9.0 ± 3.2 vs 11.2 ± 3.0 minutes; P = 0.001）。

結論：雖然 DI 法和 TII 法超聲引導下鎖骨上臂叢神經阻滯似乎成功率相似，但是我們不排除17.9%的組內差異可能未被檢測出。由於起效時間短，TII 技術可以提供更短的總麻醉相關時間。
BACKGROUND: In this prospective, randomized, observer-blinded study, we compared double-injection (DI) ultrasound-guided supraclavicular block to a novel targeted intracluster-injection (TII) technique, whereby local anesthetic is injected inside the main and satellite neural clusters (confluences of trunks and divisions of the brachial plexus).

METHODS: Ninety patients were randomly allocated to receive a DI (n = 45) or TII (n = 45) technique for ultrasound-guided supraclavicular block. The local anesthetic drug (lidocaine 1.5% with epinephrine 5 μg/mL) and total volume (32 mL) were identical in all subjects. In both groups, half the volume (16 mL) was injected inside the main neural cluster. For the DI technique, the second half (16 mL) was deposited at the "corner pocket" (intersection of the first rib and subclavian artery). In contrast, for the TII technique, the remaining half was divided into equal aliquots and injected inside every single satellite cluster. The main outcome variable was the total anesthesia-related time (sum of performance and onset times).

RESULTS: Due to a quicker onset (mean ± standard deviation (SD): 10.1 ± 6.4 vs 18.5 ± 8.3 minutes; P < 0.0001), the total anesthesia-related time was shorter with the TII technique (21.2 ± 7.7 vs 27.7 ± 9.0 minutes; P = 0.001; 95% confidence interval for the difference of the means: 2.90-10.08 minutes). There were 0 (of 45) and 3 (of 45) surgical failures for the TII and DI group, respectively. Thus, the 2 methods achieved comparable rates of surgical anesthesia (93.3%-100.0%; 95% confidence interval for the difference of the success rates: -2.3% to 17.9%). No intergroup differences were observed in block-related pain scores and adverse events. The DI group required fewer needle passes (median ± interquartile range: 4 ± 2 vs 7 ± 3; P < 0.0001) as well as shorter needling (8.4 ± 2.9 vs 10.7 ± 2.7 minutes; P < 0.0001) and performance (9.0 ± 3.2 vs 11.2 ± 3.0 minutes; P = 0.001) times.

CONCLUSION: Although DI and TII ultrasound-guided supraclavicular blocks seem to provide comparable success rates, we cannot exclude the possibility that an intergroup difference of 17.9% might have gone undetected. Due to its quick onset, the TII technique results in a shorter total anesthesia-related time.