局部麻醉對胃食管癌手術結局的影響：文獻系統綜述

Impact of Regional Anesthesia on Gastroesophageal Cancer Surgery Outcomes: A Systematic Review of the Literature

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局部麻醉可能對腫瘤的長期結局有積極作用。特別是已有研究表明局部麻醉可以調節免疫和炎症應答，從而延長胃腸道惡性腫瘤術後（包括胃癌和食管癌）的無瘤生存時間和總生存時間。然而人類研究的結果與之並不一致。這篇系統綜述的目的是總結局部麻醉對胃食管手術術後免疫調節和腫瘤復發產生影響的證據。我們在 5 個不同的資料庫中進行文獻搜索。兩名獨立的審核人根據預先設定的納入和排除標準進行選中初稿的品質分析。隨機對照試驗應用 Cochrane 風險偏倚評估工具評估潛在的來源偏倚。共有 6 項研究被納入品質分析和系統綜述。因為研究之間的高異質性、研究的低品質和缺乏標準結局的定義，我們並沒有進行 Meta 分析。雖然這些文獻表明局部麻醉在受試人群中有一定調節炎症和免疫應答的作用，但是我們的系統綜述表明並沒有證據支援或反駁硬膜外麻醉或鎮痛的應用可以降低胃食管癌術後的復發率。

（王雅婷譯 潘豔、薛張綱校）

Regional anesthesia may play a beneficial role in long-term oncological outcomes. Specifically, it has been suggested that it can prolong recurrence-free survival and overall survival after gastrointestinal cancer surgery, including gastric and esophageal cancer, by modulating the immune and inflammatory response. However, the results from human studies are conflicting. The goal of this systematic review was to summarize the evidence on the impact of regional anesthesia on immunomodulation and cancer recurrence after gastric and esophageal surgery. We conducted a literature search of 5 different databases. Two independent reviewers analyzed the quality of the selected manuscripts according to prespecified inclusion and exclusion criteria. Randomized controlled trials were assessed for potential sources of bias by using the Cochrane Risk of Bias tool. A total of 6 studies were included in the quality analysis and systematic review. A meta-analysis was not conducted for several reasons, including high heterogeneity among studies, low quality of the reports, and lack of standardized outcomes definitions. Although the literature suggests that regional anesthesia has some modulatory effects on the inflammatory and immunological response in the studied patient population, our systematic review indicates that there is no evidence to support or refute the use of epidural anesthesia or analgesia with the goal of reducing cancer recurrence after gastroesophageal cancer surgery.

使用實施研究統一框架實施的圍手術期音樂療法

Implementation of Perioperative Music Using the Consolidated Framework for Implementation Research

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背景：補充性整體健康療法在圍術期具有減輕疼痛，減少鎮痛藥的使用，減輕患者的焦慮以及提高患者滿意度的作用。但是，該療法長期使用具有不同程度的滯後性。實施研究統一框架（CFIR）可以減輕這一問題。

方法：我們審查了幾個非藥物治療的證據（CFIR 域：干預的特徵），並通過調查 11 個退伍軍人（VA）醫院（外部和內部設置）的醫療工作者研究外部背景和應變組織能力。我們詢問患者接受音樂療法的意願，並對此與已知的阿片類藥物使用風險因素之間的聯繫（個體特徵）進行研究。我們為圍手術期使用裝有退伍軍人喜歡的音樂的數位音樂播放機實施了一個規範，並評估了其在 6 個月內接受關節替換的患者亞組中的情況（實施過程））。然後，我們提取了術後恢復時間和其他轉歸的資料，並將它們與既往或同期佇列進行比較。

結果：證據從強烈和直接到微弱和間接不等，強證據包的圍手術期音樂療法和針灸，弱證據包括冥想，瑜伽和太極拳。97 名圍手術期醫療工作者完成了應變能力的研究，結果顯示其均得到正分數（平均值> 0，範圍從-2 到+2，相當於> 2.5 分在 5 分李克特量表中）。與大多數其他 VA 醫院（+0.05--+0.63）相比，Durham（+0.47）的應變能力更好。3307 名退伍軍人詢問是否願意接受音樂療法，大約 68％（n = 2252）回答“是”。在多變數分析中，年紀越輕術前疼痛評分越高（入院前 90 天內> 4 分），二者呈正相關，該評分是與阿片類藥物過度使用相關的因

素。目標分組中的比例適中（81 個接收者中有 39 個接收音樂療法），這可能是由於擴大到非目標人群中時，設備不可用性可能會降低。術後恢復時間沒有改變，表明該策略可以順利整合到工作流程中。

結論：CFIR 指導下實施的圍手術期音樂療法在三級 VA 醫院是可行的，這類醫院中高危患者比例適中。使用具有患者喜歡的播放清單的數位音樂播放機得到了大力推薦，醫療工作者的良好的應變能力，患者（特別是有阿片類藥物過度使用風險的人）的良好接受度以及規範化的實施方法均發揮了重要作用。確定類似的有效的理論轉化醫療活動的框架尚需進一步研究

(馬瑞華譯 潘豔、薛張綱校)

BACKGROUND: Complementary integrative health therapies have a perioperative role in the reduction of pain, analgesic use, and anxiety, and increasing patient satisfaction. However, long implementation lags have been quantified. The Consolidated Framework for Implementation Research (CFIR) can help mitigate this translational problem.
METHODS: We reviewed evidence for several nonpharmacological treatments (CFIR domain: characteristics of interventions) and studied external context and organizational readiness for change by surveying providers at 11 Veterans Affairs (VA) hospitals (domains: outer and inner settings). We asked patients about their willingness to receive music and studied the association between this and known risk factors for opioid use (domain: characteristics of individuals). We implemented a protocol for the perioperative use of digital music players loaded with veteran-preferred playlists and evaluated its penetration in a subgroup of patients undergoing joint replacements over a 6-month period (domain: process of implementation). We then extracted data on postoperative recovery time and other outcomes, comparing them with historic and contemporary cohorts.
RESULTS: Evidence varied from strong and direct for perioperative music and acupuncture, to modest or weak and indirect for mindfulness, yoga, and tai chi, respectively. Readiness for change surveys completed by 97 perioperative providers showed overall positive scores (mean >0 on a scale from -2 to +2, equivalent to >2.5 on the 5-point Likert scale). Readiness was higher at Durham (+0.47) versus most other VA hospitals (range +0.05 to +0.63). Of 3307 veterans asked about willingness to receive music, approximately 68% (n = 2252) answered "yes." In multivariable analyses, a positive response (acceptability) was independently predicted by younger age and higher mean preoperative pain scores (>4 out of 10 over 90 days before

admission), factors associated with opioid overuse. Penetration was modest in the targeted subset (39 received music out of a possible 81 recipients), potentially reduced by device nonavailability due to diffusion into nontargeted populations. Postoperative recovery time was not changed, suggesting smooth integration into workflow**.**
CONCLUSIONS:CFIR-guided implementation of perioperative music was feasible at a tertiary VA hospital, with moderate penetration in a high-risk subset of patients. Use of digital music players with preferred playlists was supported by strong evidence, tension for change, modest readiness among providers, good acceptability among patients (especially those at risk for opioid overuse), and a protocolized approach. Further study is needed to identify similar frameworks for effective knowledge-translation activities.

用利多卡因及左旋布比卡因有效滅活依賴抑制成人及新生兒 **Nav1.5** 通道

Potent Inactivation-Dependent Inhibition of Adult and Neonatal Nav1.5 Channels by Lidocaine and Levobupivacaine

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背景：局麻藥（LAs）的心臟毒性涉及抑制 Nav1.5 鈉電控通道。轉移性乳腺癌和結腸癌細胞也表達 Nav1.5 通道，主要是新生兒剪切變異體 (nNaV1.5)以及通過 LAs 抑制其侵襲轉移。通過選擇性阻斷和或優先失活在癌細胞中佔優勢的 nNaV1.5 通道，靶向癌細胞從而保護心臟功能的是有益的。我們分別從（1）成人及新生兒 Nav1.5 通道（2）Nav1.5 通道的休眠和失活狀態來驗證利多卡因及左旋布比卡因的差異影響。

方法：在 HEK-293 細胞中使用全細胞電壓鉗技術評價利多卡因及左旋布比卡因在重組表達 Nav1.5 通道的作用。細胞轉染瞬間通過 cDNA 決定編碼 aNaV1.5 或 nNaV1.5。使用電壓來決定去極化點位來活化或者失活 50%時的最大電導（分別為 V½活化及 V½失活）。

結果：利多卡因及左旋布比卡因在保持電位-80mV 有效抑制值在 aNaV1.5（IC50 均值[標準差]分別為 20[22]和 1[0.6]μm）和 nNaV1.5 (IC50 均值[標準差]分別為 17 [10] 和 3 [1.6] μm）。在沒有剪切變異體的影響下利多卡因和左旋布比卡因對

IC50 有顯著差異。左旋布比卡因在 aNaV1.5 中 V½活化的去極化偏移存在統計學意義（均值[標準差]從-32 [4.6] mV 到 -26 [8.1] mV），但對 nNaV1.5 電控活化並沒有影響。利多卡因對於兩種受體 V½活化均無影響，但 nNaV1.5 與 aNaV1.5 相比存在最大電導的顯著降低。對於兩種 LAs 及兩種 NaV1.5 通道在 V½失活（約 10mV）中也存在相似的統計學顯著偏移。左旋布比卡因 (1μm)相對於利多卡因 (10μm)顯著降低了兩種變異體的復蘇速度。兩種局麻藥在-80 mV 下保持約 50% 抑制 aNaV1.5 或 nNaV1.5 的作用。兩種 LAs 在-90 或-120mV 時，幾乎沒有穩態失活。較高濃度的利多卡因 (300μm)或左旋布比卡因(100μm)在-120mV 時存在一個明顯的阻滯。

結論：這些資料表明，低濃度的局麻藥表現出與 NaV1.5 失活相關，這在其無心臟毒性的情況下安全的抑制轉移性癌細胞的遷移和侵襲提供了理論依據。

（龐豔蓉譯 潘豔、薛張綱校）

BACKGROUND: Cardiotoxic effects of local anesthetics (LAs) involve inhibition of NaV1.5 voltage-gated Na channels. Metastatic breast and colon cancer cells also express NaV1.5, predominantly the neonatal splice variant (nNaV1.5) and their inhibition by LAs reduces invasion and migration. It may be advantageous to target cancer cells while sparing cardiac function through selective blockade of nNaV1.5 and/or by preferentially affecting inactivated NaV1.5, which predominate in cancer cells. We tested the hypotheses that lidocaine and levobupivacaine differentially affect (1) adult (aNaV1.5) and nNaV1.5 and (2) the resting and inactivated states of NaV1.5.

METHODS: The whole-cell voltage-clamp technique was used to evaluate the actions of lidocaine and levobupivacaine on recombinant NaV1.5 channels expressed in HEK-293 cells. Cells were transiently transfected with cDNAs encoding either aNaV1.5 or nNaV1.5. Voltage protocols were applied to determine depolarizing potentials that either activated or inactivated 50% of maximum conductance (V½ activation and V½ inactivation, respectively).

RESULTS: Lidocaine and levobupivacaine potently inhibited aNaV1.5 (IC50 mean [SD]: 20 [22] and 1 [0.6] μM, respectively) and nNaV1.5 (IC50 mean [SD]: 17 [10] and 3 [1.6] μM, respectively) at a holding potential of -80 mV. IC50s differed significantly between lidocaine and levobupivacaine with no influence of splice variant. Levobupivacaine induced a statistically significant depolarizing shift in the

V½ activation for aNaV1.5 (mean [SD] from -32 [4.6] mV to -26 [8.1] mV) but had no effect on the voltage dependence of activation of nNaV1.5. Lidocaine had no effect on V½ activation of either variant but caused a significantly greater depression of maximum current mediated by nNaV1.5 compared to aNaV1.5. Similar statistically significant shifts in the V½ inactivation (approximately -10 mV) occurred for both LAs and NaV1.5 variants. Levobupivacaine (1 μM) caused a significantly greater slowing of recovery from inactivation of both variants than did lidocaine (10 μM). Both LAs caused approximately 50% tonic inhibition of aNaV1.5 or nNaV1.5 when holding at -80 mV. Neither LA caused tonic block at a holding potential of either -90 or -120 mV, voltages at which there was little steady-state inactivation. Higher concentrations of either lidocaine (300 μM) or levobupivacaine (100 μM) caused significantly more tonic block at -120 mV.
CONCLUSIONS: These data demonstrate that low concentrations of the LAs exhibit inactivation-dependent block of NaV1.5, which may provide a rationale for their use to safely inhibit migration and invasion by metastatic cancer cells without cardiotoxicity.

α-細辛醚通過抑制肝臟 X 受體依賴性脊髓內質網應激減輕慢性壓迫性損傷所致神經病理性疼痛

α-Asarone Alleviated Chronic Constriction Injury–Induced Neuropathic Pain Through Inhibition of Spinal Endoplasmic Reticulum Stress in an Liver X Receptor–Dependent
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背景：神經性疼痛是一種難治性且複雜的疾病。 最近的研究表明，內質網（ER）應激與神經病理性疼痛之間存在密切關係。 在這裡，我們研究了 α-細辛醚（一種 ER 應激抑制劑）對慢性壓迫性損傷（CCI）引起的神經性疼痛的影響。

方法：本研究包括兩部分。 在第 1 部分中，將大鼠分成 7 組：假手術組，假手術+α-細辛醚-20mg / kg 組，CCI 組，CCI +溶劑組，CCI +α-細辛醚 5mg / kg 組，CCI +α-細辛醚 10mg / kg 組和 CCI +α-細辛醚 20mg / kg 組。 術後，每天用 α-細辛醚或生理鹽水處理大鼠。 測量疼痛閾值，並且在第 7 天採集 L3-6 脊髓的樣品進行蛋白質印跡和免疫螢光。在部分 2 中，將大鼠鞘內植入 PE-10 管並分成 4 組：CCI +α-細辛醚 20mg / kg 組，CCI +α-細辛醚 20mg / kg +溶劑組，CCI +α-細

辛醚 20mg / kg + SR9243 組和 CCI 組。在鞘內注射後 1 小時，將每組中的 5 只大鼠分開進行行為測試。 其餘的大鼠在第 7 天被殺死進行蛋白質印跡測試。

結果：在這項研究中，CCI 手術顯著誘發機械性異常性疼痛和熱痛覺過敏。 CCI 手術顯著誘導大鼠 ER 應激（PERK-eIF2α，IRE1α，CHOP 和 XBP-1s）的啟動。 然而，用 20mg / kg 的 α-細辛醚治療顯著減輕了 CCI 誘導的 ER 應激的啟動。 行為結果顯示，在第 7 天，每天用 20mg / kg 的 α-細辛醚治療顯著減輕了 CCI 誘導的傷害感受行為（機械性異常性疼痛，P = .016,95％置信區間，0.645-5.811;熱痛覺過敏，P = .012,95％置信區間，0.860-6.507）。 此外，α-細辛醚誘導肝 X 受體 β（LXRβ）和脊髓中下游蛋白的表達上調。 LXR 拮抗劑 SR9243 完全抑制 α-細辛醚在大鼠中的抗 ER 應激和抗傷害感受作用。

結論：α-細辛醚以 LXR 依賴性方式緩解 CCI 誘導的神經性疼痛。 α-細辛醚可以作為治療神經性疼痛的潛在藥劑。

（許智鴻譯 潘豔、薛張綱校）

BACKGROUND: Neuropathic pain is an intractable and complex disease. Recent studies have shown a close relationship between endoplasmic reticulum (ER) stress and neuropathic pain. Here, we investigated the effect of [alpha]-asarone, an ER stress inhibitor, on chronic constriction injury (CCI)-induced neuropathic pain. **METHODS:** Two parts were included in this study. In part 1, rats were assigned to 7 groups: the sham group, the sham + [alpha]-asarone 20 mg/kg group, the CCI group, the CCI + vehicle group, the CCI + [alpha]-asarone 5 mg/kg group, the CCI + [alpha]-asarone 10 mg/kg group, and the CCI + [alpha]-asarone 20 mg/kg group. After surgery, the rats were treated with [alpha]-asarone or normal saline daily. Pain thresholds were measured, and samples of the L3-6 spinal cord were taken for western blotting and immunofluorescence on day 7. In part 2, rats were intrathecally implanted with PE-10 tubes and divided into 4 groups: the CCI + [alpha]-asarone 20 mg/kg group, the CCI + [alpha]-asarone 20 mg/kg + vehicle group, the CCI + [alpha]-asarone 20 mg/kg + SR9243 group, and the CCI group. Five rats in each group were separated for behavioral tests 1 hour after intrathecal injection. The rest of them were killed for western blotting on day 7.
RESULTS: In this study, CCI surgery significantly induced mechanical allodynia and thermal hyperalgesia. CCI surgery significantly induced activation of ER stress

(PERK-eIF2[alpha], IRE1[alpha], CHOP, and XBP-1s) in rats. However, treatment with 20 mg/kg of [alpha]-asarone significantly alleviated CCI-induced activation of ER stress. Behavioral results showed that daily treatment with 20 mg/kg of [alpha]-asarone significantly alleviated CCI-induced nociceptive behaviors, on day 7 (mechanical allodynia, P = .016, 95% confidence interval, 0.645-5.811; thermal hyperalgesia, P = .012, 95% confidence interval, 0.860-6.507). Furthermore, [alpha]-asarone induced upregulated expression of liver X receptor [beta] (LXR[beta]) and downstream proteins in the spinal cord. The LXR antagonist SR9243 completely inhibited the anti-ER stress and antinociceptive effects of [alpha]-asarone in rats. **CONCLUSIONS:** [alpha]-Asarone relieved CCI-induced neuropathic pain in an LXR-dependent manner. [alpha]-Asarone may be a potential agent for treatment of neuropathic pain.

右旋美托咪定在兒童門診手術應用中的群體藥代動力學及藥效學

Population Pharmacokinetics and Pharmacodynamics of Dexmedetomidine in Children Undergoing Ambulatory Surgery

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背景：右旋美托咪定（dexmedetomidine，DEX）是一種 α2 腎上腺素能激動劑，具有鎮靜和鎮痛作用。雖然未經兒童食品藥品監督管理局批准使用，但是右美越來越多地被應用于小兒麻醉和重症監護。然而，可以獲得的關於右美被用於兒童的藥代動力學的資料非常有限。本課題旨在研究在墨西哥 2-18 歲接受門診手術治療的兒童中使用的右美的藥代動力學和藥效學（PK–PD）。

方法：30 名 2-18 歲的被美國麻醉醫師學會身體狀況評分評為 I / II 的兒童被納入本項研究。右美單次靜脈輸注給藥的劑量為 0.7μg/kg。採集靜脈血樣，結合高效

液相色譜和電噴霧電離串聯質譜分析血漿右美濃度。使用 Monolix 程式構建群體 PK-PD 模型。。

結果：二室模型充分地描述了濃度-時間關係。使用異速生長模型將體重標準設為 70 公斤。總體參數估計如下： 平均值（受試者間差異）：清除率（Cl）（L/h×70kg）=20.8（27%）；中心分佈容積（V1）（L×70kg）=21.9（20%）；外周分佈容積（V2）（L×70kg）=81.2（21%）；隔室間清除率（Q）（L/h×70kg）=75.8（25%）。PK-PD 模型預測 IC50 為 0.501ng/ml 時最大平均動脈血壓下降 45%，IC50 為 0.552ng/ml 時最大心率下降 28.9%。

結論：我們的研究結果提示，在墨西哥 2-18 歲美國麻醉師協會 I/II 評分的兒童中，使用右美的劑量應根據較低的右美清除率進行調整。

（湯潔譯 潘豔、薛張綱校）

BACKGROUND: Dexmedetomidine (DEX) is an α-2 adrenergic agonist with sedative and analgesic properties. Although not approved for pediatric use by the Food and Drug Administration, DEX is increasingly used in pediatric anesthesia and critical care. However, very limited information is available regarding the pharmacokinetics of DEX in children. The aim of this study was to investigate DEX pharmacokinetics and pharmacodynamics (PK–PD) in Mexican children 2–18 years of age who were undergoing outpatient surgical procedures.
METHODS: Thirty children 2–18 years of age with American Society of Anesthesiologists physical status score of I/II were enrolled in this study. DEX (0.7 μg/kg) was administered as a single-dose intravenous infusion. Venous blood samples were collected, and plasma DEX concentrations were analyzed with a combination of high-performance liquid chromatography and electrospray ionization-tandem mass spectrometry. Population PK–PD models were constructed using the Monolix program.
RESULTS: A 2-compartment model adequately described the concentration–time relationship. The parameters were standardized for a body weight of 70 kg by using an allometric model. Population parameters estimates were as follows: mean (between-subject variability): clearance (Cl) (L/h × 70 kg) = 20.8 (27%); central volume of distribution (V1) (L × 70 kg) = 21.9 (20%); peripheral volume of distribution (V2) (L × 70 kg) = 81.2 (21%); and intercompartmental clearance (Q) (L/h × 70 kg) = 75.8 (25%). The PK–PD model predicted a maximum mean arterial blood pressure reduction of 45% with an IC50 of 0.501 ng/ml, and a maximum heart

rate reduction of 28.9% with an IC50 of 0.552 ng/ml.
CONCLUSIONS: Our results suggest that in Mexican children 2–18 years of age with American Society of Anesthesiologists score of I/II, the DEX dose should be adjusted in accordance with lower DEX clearance.

瑞典學術型醫院創傷性腦損傷後的植物人狀態發生率低

Low Level of Vegetative State After Traumatic Brain Injury in a Swiss Academic Hospital
Stretti F, Klinzing S, Ehlers U, Steiger P, Schuepbach R, Krones T, Brandi G.
.Anesthesia & Analgesia: 2018 127 698-703.

背景:關於昏迷患者的決策沒有標準,特別是關於挽救生命的治療。這項回顧性，單中心研究的目的是分析瑞士學術三級醫院中創傷性腦損傷（TBI）患者的臨終結果和決策過程（EOL）。

方法：在 2012 年 1 月 1 日至 2015 年 6 月 30 日期間，至少進行 48 小時的外科重症監護病房（ICU）監護的中度至重度 TBI 患者及創傷性腦損傷後 6 個月內的死亡率被連續入組。使用了描述性統計資料。

結果：在研究期間，有 994 例 ICU 入院患者，其中 182 例初始格拉斯哥昏迷量表<13，ICU 住院時間> 48 小時。其中 174 例可根據格拉斯哥預後量表（GOS）進行為期 6 個月的結果評估：43.1%（36.0%-50.5%）有良好預後（GOS 4 或 5），28.7%（22.5%-35.9%） ）嚴重殘疾（GOS 3），0.6%（0%-3.2%）植物人狀態（GOS 2），27.6%（21.5%-34.7%）死亡（GOS 1）。在 GOS 1 個體中，45 名患者具有完整的資料集（73%的男性;中位年齡，67 歲;四分位數範圍，43-79 歲）。在跨學科預測和代理決策者（SDM）參與尊重患者醫囑或意願後，延長壽命的療法僅限於 95.6%（85.2%-99.2%）。在 97.7%（87.9%-99.9%）的病例中，近親屬是代理決策者,參與臨終決策和過程的 100%（96.3%-100.0%）的病例。 14.0%（6.6%-27.3%）的患者可獲得書面預先指示（ADs），34.9%（22.4%-49.8%）

患者在創傷前與親屬分享臨終意願。在其他情況下，每個患者的假定遺囑在與代理決策者會面後得到承認，並且對臨終決定具有約束力。

結論：在我們的機構中，TBI 之後的大多數死亡都是在決定限制延長生命的療法之後。 TBI 後 6 個月處於植物人狀態的患者頻率低於預期; 這可能是由於延長壽命限制療法的普遍存在。臨終決策遵循標準化流程，基於書面預先指示中記錄的患者意願或代理決策者假設的偏好。有書面預先指示的患者植物人狀態患病率很低，應予以鼓勵。

（彭孟圓 譯 潘豔、薛張綱校）

BACKGROUND: No standards exist regarding decision making for comatose patients, especially concerning life-saving treatments. The aim of this retrospective, single-center study was to analyze outcomes and the decision-making process at the end of life (EOL) in patients with traumatic brain injury (TBI) in a Swiss academic tertiary care hospital.
METHODS: Consecutive admissions to the surgical intensive care unit (ICU) with stays of at least 48 hours between January 1, 2012 and June 30, 2015 in patients with moderate to severe TBI and with fatality within 6 months after trauma were included. Descriptive statistics were used.
RESULTS: Of 994 ICU admissions with TBI in the study period, 182 had an initial Glasgow Coma Scale <13 and a length of stay in the ICU >48 hours. For 174 of them, a 6-month outcome assessment based on the Glasgow Outcome Scale (GOS) was available: 43.1% (36.0%-50.5%) had favorable outcomes (GOS 4 or 5), 28.7% (22.5%-35.9%) a severe disability (GOS 3), 0.6% (0%-3.2%) a vegetative state (GOS 2), and 27.6% (21.5%-34.7%) died (GOS 1). Among the GOS 1 individuals, 45 patients had a complete dataset (73% men; median age, 67 years; interquartile range, 43-79 years). Life-prolonging therapies were limited in 95.6% (85.2%-99.2%) of the cases after interdisciplinary prognostication and involvement of the surrogate decision maker (SDM) to respect the patient's documented or presumed will. In 97.7% (87.9%-99.9%) of the cases, a next of kin was the SDM and was involved in the EOL decision and process in 100% (96.3%-100.0%) of the cases. Written advance directives (ADs) were available for 14.0% (6.6%-27.3%) of the patients, and 34.9% (22.4%-49.8%) of the patients had shared their EOL will with relatives before trauma. In the other cases, each patient's presumed will was acknowledged after a meeting with the SDM and was binding for the EOL decision.
CONCLUSIONS: At our institution, the majority of deaths after TBI follow a decision to limit life-prolonging therapies. The frequency of patients in vegetative state 6 months after TBI is lower than expected; this could be due to the

high prevalence of limitation of life-prolonging therapies. EOL decision making follows a standardized process, based on patients' will documented in the ADs or on preferences assumed by the SDM. The prevalence of ADs was low and should be encouraged.

心血管手術中的纖維蛋白原濃縮物：一項隨機對照試驗的薈萃分析

Fibrinogen Concentrate in Cardiovascular Surgery: A Meta-analysis of Randomized Controlled Trials

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背景：心血管手術後出血是一項常見的併發症，並可能導致增加嚴重併發症發生率和死亡率。觀察性研究顯示內源性血漿纖維蛋白原濃度的降低與心臟手術後失血風險的增加緊密相關。雖然輸注纖維蛋白原濃縮物越來越常見，但是在心血管手術中，圍術期纖維蛋白原輸注相關的潛在利益和風險仍不清楚。

方法：作者利用自動更新功能在 PubMed, Cochrane Library, Ovid MEDLINE, Embase, Web of Science,和 China National Knowledge Infrastructure 上檢索 2017 年 1 月 15 日至 2018 年 2 月 15 日期間在成人心血管手術中以預防或治療出血為目的而使用纖維蛋白原濃縮物相關的所有隨機對照試驗（RCT）。所有符合下列條件的 RCT 均被納入研究：將輸注纖維蛋白原組與其他組（安慰劑/標準的治療措施或其它靈活的對照）進行比較，並至少報告了一項預先定義的臨床結局。對於二分類變數和連續型變數，利用隨機效應模型分別計算出相對風險度和加權平均差異（95%的可信區間）。預先計畫根據纖維蛋白原的劑量和出血的基線風險進行亞組分析。

結果：一共納入了 8 項有關纖維蛋白原濃縮物應用于高危或者混合風險的成人心血管手術的隨機對照研究（n=597）。與安慰劑或非活性對照組相比，圍術期輸

注濃縮纖維蛋白原並不能顯著影響全因死亡率（rr，0.41；95%CI，0.12-1.38;I=10%P=.15）。纖維蛋白原顯著減少了同種異體紅細胞輸血的發病率（rr，0.64；95%CI，0.49-0.83；I=0%;P=.001）。在其他結局變數裡並未找到明顯的差異。當根據纖維蛋白原劑量，輸注初始時間，平均心肺轉流時間和旋轉式血栓彈力計/FIBTEM 的使用進行分析時，亞組分析沒有顯著差異（所有亞組相互作用的 P 值均不顯著）。

結論：現有的證據不足以支持或反對圍術期纖維蛋白原濃縮物在成人心血管手術中的常規應用。纖維蛋白原濃縮物可能會減少心血管手術中高危或出血的成人患者額外異體血液產品的輸注。然而，並沒有發現相關的可降低死亡風險或其他臨床相關結果的確定優勢。在已有的隨機試驗中，少量的臨床事件提示需要設計得更為完善、有著足夠檢驗效力和持續時間的試驗來衡量全因死亡率，卒中，心肌梗死，再次手術和血栓栓塞事件。未來的研究還應該解決與標準治療相關的成本效益問題。

（馮昭妍 譯　陳傑 校）

BACKGROUND: Postoperative bleeding remains a frequent complication after cardiovascular surgery and may contribute to serious morbidity and mortality. Observational studies have suggested a relationship between low endogenous plasma fibrinogen concentration and increased risk of postoperative blood loss in cardiac surgery. Although the transfusion of fibrinogen concentrate has been increasing, potential benefits and risks associated with perioperative fibrinogen supplementation in cardiovascular surgery are not fully understood.
METHODS: PubMed, Cochrane Library, Ovid MEDLINE, Embase, Web of Science, and China National Knowledge Infrastructure were searched on January 15, 2017, with automated updates searched until February 15, 2018, to identify all randomized controlled trials (RCTs) of fibrinogen concentrate, whether for prophylaxis or treatment of bleeding, in adults undergoing cardiovascular surgery. All RCTs comparing fibrinogen infusion versus any other comparator (placebo/standard of care or another active comparator) in adult cardiovascular surgery and reporting at least 1 predefined clinical outcome were included. The random-effects model was used to calculate risk ratios and weighted mean differences (95% confidence interval [CI]) for

dichotomous and continuous variables, respectively. Subgroup analyses by fibrinogen dose and by baseline risk for bleeding were preplanned.
RESULTS: A total of 8 RCTs of fibrinogen concentrate in adults (n = 597) of mixed risk or high risk undergoing cardiovascular surgery were included. Compared to placebo or inactive control, perioperative fibrinogen concentrate did not significantly impact risk of all-cause mortality (risk ratio, 0.41; 95% CI, 0.12-1.38; I = 10%; P = .15). Fibrinogen significantly reduced incidence of allogeneic red blood cell transfusion (risk ratio, 0.64; 95% CI, 0.49-0.83; I = 0%; P = .001). No significant differences were found for other clinical outcomes. Subgroup analyses were unremarkable when analyzed according to fibrinogen dose, time of infusion initiation, mean cardiopulmonary bypass time, and rotational thromboelastometry/fibrinogen temogram use (all P values for subgroup interaction were nonsignificant).
CONCLUSIONS: Current evidence remains insufficient to support or refute routine perioperative administration of fibrinogen concentrate in patients undergoing cardiovascular surgery. Fibrinogen concentrate may reduce the need for additional allogeneic blood product transfusion in cardiovascular surgery patients at high risk or with evidence of bleeding. However, no definitive advantage was found for reduction in risk of mortality or other clinically relevant outcomes. The small number of clinical events within existing randomized trials suggests that further well-designed studies of adequate power and duration to measure all-cause mortality, stroke, myocardial infarction, reoperation, and thromboembolic events should be conducted. Future studies should also address cost-effectiveness relative to standard of care.

有關對青黴素過敏的誤解：對麻醉醫師的影響

Misconceptions Surrounding Penicillin Allergy: Implications for Anesthesiologists

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通過使用諸如頭孢菌素進行術前抗菌預防是手術部位感染預防指南的主要依據。不幸的是，由於普遍的誤解，被標記為青黴素過敏的患者通常會使用替代性和效果較差的抗生素，使他們面臨各種副作用的風險，其中包括發病率增加，手術部位的感染風險增加。圍手術期醫生應該確定先前過敏反應的性質，以幫助確定真正過敏的可能性。可以進行青黴素過敏測試，但在圍手術期並非可行。關於青黴素和頭孢菌素過敏結構決定因素的現有證據反駁了青黴素和頭孢唑啉之間存在交叉反應的誤解，並且目前尚無明確證據表明青黴素過敏患者接受頭孢唑啉治療

時過敏反應的風險增加。圍手術期評估的臨床實踐演算法和報告青黴素過敏史的患者管理呈現並得出結論頭孢菌素可以安全給予。

（金麗娜 譯 陳傑 校）

Administration of preoperative antimicrobial prophylaxis, often with a cephalosporin, is the mainstay of surgical site infection prevention guidelines. Unfortunately, due to prevalent misconceptions, patients labeled as having a penicillin allergy often receive alternate and less-effective antibiotics, placing them at risk of a variety of adverse effects including increased morbidity and higher risk of surgical site infection. The perioperative physician should ascertain the nature of previous reactions to aid in determining the probability of the prevalence of a true allergy. Penicillin allergy testing may be performed but may not be feasible in the perioperative setting. Current evidence on the structural determinants of penicillin and cephalosporin allergies refutes the misconception of cross-reactivity between penicillins and cefazolin, and there is no clear evidence of an increased risk of anaphylaxis in cefazolin-naive, penicillin-allergic patients. A clinical practice algorithm for the perioperative evaluation and management of patients reporting a history of penicillin allergy is presented, concluding that cephalosporins can be safely administered to a majority of such patients.

疼痛及其對危重病患者日常生活的長期影響

Pain and Its Long-term Interference of Daily Life After Critical Illness

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背景:持續性疼痛常影響危重病患者的生活品質，但是研究資料僅限於流行病學及風險因素方面。作者試圖尋找危重病患者持續性疼痛的流行病學特點及其對日常生活的影響。另外研究重症監護期間使用阿片類藥物是否會增加持續性疼痛發展的風險。

方法:針對一個成年 ICU 倖存者佇列，使用簡易疼痛評分方法（BPI）來評估疼痛程度，及疼痛對出院後 3～12 個月期間患者日常生活的影響。考慮到潛在的干擾因素（如:年齡，前期阿片類藥物的使用，體質虛弱、手術因素、疾病嚴重程

度、譫妄持續時間、膿毒症）的前提下，作者使用了 BPI 評分，應用累積優勢序列回歸 Bonferroni 校正法來評估危重病患者使用阿片類藥物與疼痛之間的獨立聯繫。

結果:一共獲得了 295 個患者的 BPI 評分資料。資料表明:在出院後的 3～12 個月期間，74%-77%患者存在持續性疼痛的症狀。出院後 3～12 個月期間，疼痛程度評分的中位數（四分位距)是 3（1，5）。出院後的 3～12 個月期間，分別有 59%、62%的患者在第 3 月和第 12 月表示疼痛影響到了其日常生活。出院後 3 個月和 12 個月的總體疼痛干涉評分中位數為 2 (0, 5)。ICU 阿片藥物的使用與出院後 3 個月（ [OR; 95% 置信區間], 2.12 [0.92-4.93]; P = .18）或 12 個月 (OR, 2.58 [1.26-5.29]; P = .04)的疼痛對日常生活的影響無關。

結論:持續性疼痛常伴發於危重病之後且頻繁影響日常生活。危重病患者阿片類藥物使用量的增加與疼痛程度的加劇無關。總而言之，明確危重病患者持續性疼痛的可變風險因素，以及危重病患者（無論是否有慢性疼痛）使用阿片類藥物的療效，仍然需要更深層次的研究。

（陳冬芳 譯 陳傑 校）

BACKGROUND: Persistent pain likely interferes with quality of life in survivors of critical illness, but data are limited on its prevalence and risk factors. We sought to determine the prevalence of persistent pain after critical illness and its interference with daily life. Additionally, we sought to determine if intensive care unit (ICU) opioid exposure is a risk factor for its development.
METHODS: In a cohort of adult medical and surgical ICU survivors, we used the brief pain inventory (BPI) to assess pain intensity and pain interference of daily life at 3 and 12 months after hospital discharge. We used proportional odds logistic regression with Bonferroni correction to evaluate the independent association of ICU opioid exposure with BPI scores, adjusting for potential confounders including age, preadmission opioid use, frailty, surgery, severity of illness, and durations of delirium and sepsis while in the ICU.
RESULTS: We obtained BPI outcomes in 295 patients overall. At 3 and 12 months, 77% and 74% of patients reported persistent pain symptoms, respectively. The median

(interquartile range) pain intensity score was 3 (1, 5) at both 3 and 12 months. Pain interference with daily life was reported in 59% and 62% of patients at 3 and 12 months, respectively. The median overall pain interference score was 2 (0, 5) at both 3 and 12 months. ICU opioid exposure was not associated with increased pain intensity at 3 months (odds ratio [OR; 95% confidence interval], 2.12 [0.92-4.93]; P = .18) or 12 months (OR, 2.58 [1.26-5.29]; P = .04). ICU opioid exposure was not associated with increased pain interference of daily life at 3 months (OR, 1.48 [0.65-3.38]; P = .64) or 12 months (OR, 1.46 [0.72-2.96]; P = .58).
CONCLUSIONS: Persistent pain is prevalent after critical illness and frequently interferes with daily life. Increased ICU opioid exposure was not associated with worse pain symptoms. Further studies are needed to identify modifiable risk factors for persistent pain in the critically ill and the effects of ICU opioids on patients with and without chronic pain.

先天性心臟病患兒非心臟手術圍術期發生心血管和呼吸系統不良事件的概率和風險因素

Incidence and Risk Factors for Perioperative Cardiovascular and Respiratory Adverse Events in Pediatric Patients With Congenital Heart Disease Undergoing Noncardiac Procedures

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背景：針對不同程度先天性心臟病兒童非心臟手術時的死亡率和圍術期不良事件，雖然已有不少多中心資料研究。然而迄今為止，研究先天性心臟病（CHD）患兒非心臟手術中發生不良結局的單中心研究中所納入的嚴重性心臟病患者數量甚少。因此，此研究是針對一群來自同一中心的先天性心臟病患者，研究其在非心臟手術圍術期發生心血管和呼吸事件的概率，並明確這些不良事件的風險因素。

方法：作者納入 5 年內在本機構接受非心臟手術的 3010 名 CHD 患者，收集患者相應的統計學資訊，包括手術經過、心臟病診斷以及用於評估術後 6 個月內心室功能的超聲心動圖，並根據 CHD 患者的殘餘病變情況和心血管功能狀態將其

分為 3 個等級（輕度、中度、重度）。此外還收集有關患者麻醉管理的資料。主要預後指標是術中心血管和呼吸事件的發生率，並採用單變數和多變數邏輯回歸的方法確定這兩種事件發生的風險因素。

結果：單變數和多變數分析表明心血管和呼吸事件的發生率分別為 11.5%和 4.7%。其中，患者圍術期發生心血管事件與其 ASA 評級（高於III級）、急診手術、中重度 CHD、單心室狀態、心室功能不全、以及矯形、普外、神外和肺部手術有關。而圍術期呼吸事件的發生與 ASA 評級（高於IV級）和耳鼻喉、胃腸、普外、頜面部手術相關。

結論：CHD 患者術中發生心血管和呼吸事件很常見。心血管事件的發生與患者心血管功能的狀況密切相關，而呼吸事件與心血管狀況並無相關性。

（錢佳紅 譯 陳傑 校）

BACKGROUND: While mortality and adverse perioperative events after noncardiac surgery in children with a broad range of congenital cardiac lesions have been investigated using large multiinstitutional databases, to date single-center studies addressing adverse outcomes in children with congenital heart disease (CHD) undergoing noncardiac surgery have only included small numbers of patients with significant heart disease. The primary objective of this study was to determine the incidences of perioperative cardiovascular and respiratory events in a large cohort of patients from a single institution with a broad range of congenital cardiac lesions undergoing noncardiac procedures and to determine risk factors for these events.
METHODS: We identified 3010 CHD patients presenting for noncardiac procedures in our institution over a 5-year period. We collected demographic information, including procedure performed, cardiac diagnosis, ventricular function as assessed by echocardiogram within 6 months of the procedure, and classification of CHD into 3 groups (minor, major, or severe CHD) based on residual lesion burden and cardiovascular functional status. Characteristics related to conduct of anesthesia care were also collected. The primary outcome variables for our analysis were the incidences of intraoperative cardiovascular and respiratory events. Univariable and multivariable logistic regressions were used to determine risk factors for these 2 outcomes.
RESULTS: The incidence of cardiovascular events was 11.5% and of respiratory events was 4.7%. Univariate analysis and multivariable analysis demonstrated that American Society of Anesthesiologists (≥3), emergency cases, major and severe CHD,

single-ventricle physiology, ventricular dysfunction, orthopedic surgery, general surgery, neurosurgery, and pulmonary procedures were associated with perioperative cardiovascular events. Respiratory events were associated with American Society of Anesthesiologists (≥4) and otolaryngology, gastrointestinal, general surgery, and maxillofacial procedures.
CONCLUSIONS: Intraoperative cardiovascular events and respiratory events in patients with CHD were relatively common. While cardiovascular events were highly associated with cardiovascular status, respiratory events were not associated with cardiovascular status.

能否通過 STOP-Bang 和脈搏血氧飽和度測定來排除阻塞性呼吸睡眠暫停綜合征？

Can STOP-Bang and Pulse Oximetry Detect and Exclude Obstructive Sleep Apnea?

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背景：阻塞性睡眠呼吸障礙綜合症（OSA）是與術後併發症有關的一種常見疾病。然而，對於未能確診的大多數 OSA 患者還需簡單的篩選工具進行診斷。本研究試圖確認 STOP-Bang 和血氧飽和度指數下降能否識別出 OSA。

方法：此項前瞻性、觀察性、多中心研究共納入 449 名成年患者，在瑞典 4 個中心通過動態多導睡眠圖、脈搏血氧飽和度和 STOP-Bang 評分來評估每個患者的 OSA 情況。STOP-Bang 評分包括：打鼾，疲勞，觀察呼吸暫停，高血壓，體重指數＞35kg/m²，年齡＞50 歲，頸圍＞40cm 和男性這 8 個肯定答案的總和。

結果：對於中度和重度睡眠呼吸障礙，STOP-Bang 臨界值是 6，定義為呼吸暫停低通氣指數(AHI)≥15，其敏感性和特異性分別為 63%（95%CI，0.55-0.70）和 69%（95%CI，0.64-0.75）。STOP-Bang＜2 有 95%概率（95%CI，0.92-0.98）可排除 AHI＞15。STOP-Bang≥6 有 91%的特異度（95%CI，0.87-0.94）使 AHI＞15，。

Bang 專案是 STOP-Bang 評分中核心部分。AHI 與 STOP-Bang 和 AHI 與脈搏氧飽和度下降呈正相關，Spearman，p 分別為 0.50（95% CI, 0.43-0.58)和 0.96 (95% CI, 0.94-0.97)。

結論：STOP-Bang 和脈搏血氧飽和度測定可用於睡眠呼吸暫停綜合症的篩查。STOP-Bang＜2 可幾乎排除中度和重度 OSA，而幾乎所有 STOP-Bang≥6 的患者都有 OSA。建議在需要對睡眠呼吸暫停綜合症進行術前篩查時增加脈搏血氧飽和度的測定和 STOP-Bang 評分為 2-5 的患者。

（郭寶超 譯 陳傑 校）

BACKGROUND: Obstructive sleep apnea (OSA) is related to postoperative complications and is a common disorder. Most patients with sleep apnea are, however, undiagnosed, and there is a need for simple screening tools. We aimed to investigate whether STOP-Bang and oxygen desaturation index can identify subjects with OSA.
METHODS: In this prospective, observational multicenter trial, 449 adult patients referred to a sleep clinic for evaluation of OSA were investigated with ambulatory polygraphy, including pulse oximetry and the STOP-Bang questionnaire in 4 Swedish centers. The STOP-Bang score is the sum of 8 positive answers to Snoring, Tiredness, Observed apnea, high blood Pressure, Body mass index >35 kg/m, Age >50 years, Neck circumference >40 cm, and male Gender.
RESULTS: The optimal STOP-Bang cutoff score was 6 for moderate and severe sleep apnea, defined as apnea-hypopnea index (AHI) ≥15, and the sensitivity and specificity for this score were 63% (95% CI, 0.55-0.70) and 69% (95% CI, 0.64-0.75), respectively. A STOP-Bang score of <2 had a probability of 95% (95% CI, 0.92-0.98) to exclude an AHI >15 and a STOP-Bang score of ≥6 had a specificity of 91% (95% CI, 0.87-0.94) for an AHI >15. The items contributing most to the STOP-Bang were the Bang items. There was a positive correlation between AHI versus STOP-Bang and between AHI versus oxygen desaturation index, Spearman ρ 0.50 (95% CI, 0.43-0.58) and 0.96 (95% CI, 0.94-0.97), respectively.
CONCLUSIONS: STOP-Bang and pulse oximetry can be used to screen for sleep apnea. A STOP-Bang score of <2 almost excludes moderate and severe OSA, whereas nearly all the patients with a STOP-Bang score ≥6 have OSA. We suggest the addition of nightly pulse oximetry in patients with a STOP-Bang score of 2-5 when there is a need for screening for sleep apnea (ie, before surgery).

使用周圍神經阻滯的足踝關節手術後出院準備:一項比較脊麻和全身麻醉作為神經阻滯補充的隨機對照試驗

Readiness for Discharge After Foot and Ankle Surgery Using Peripheral Nerve Blocks: A Randomized Controlled Trial Comparing Spinal and General Anesthesia as Supplements to Nerve Blocks

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背景：椎管內麻醉常被認為優於全身麻醉，但可能導致延遲出院。通常不使用多模式鎮痛和神經阻滯進行效果比較。神經阻滯與全身麻醉聯合使用可減輕疼痛、阿片類藥物消耗和噁心發生率。作者假設全身麻醉(複合神經阻滯)會比椎管內麻醉(複合神經阻滯)使患者更早出院。

方法：所有患者都接受了預計時間為 1-3 小時的足踝關節手術。所有患者均接受布比卡因和地塞米松注射的腘窩坐骨神經和內收肌管阻滯。術中未使用阿片類藥物。所有患者均接受昂丹司瓊、地塞米松、氯胺酮和酮洛酸治療。患者、資料收集者和資料分析師均未被告知小組分配情況。患者被隨機分配到椎管內麻醉或全身麻醉組。椎管內麻醉採用甲呱卡因並行異丙酚鎮靜。全身麻醉以異丙酚誘導後，置入喉罩，並以七氟醚和異丙酚維持。主要結果是調整年齡和手術時間後，通過使用多變數無條件分位元數回歸比較兩組患者出院前的時間。次要結果是採用 Holm-Bonferroni step-down 步驟對多個時間點的進行調整以進行多次比較。

結果：全麻患者較椎管內麻醉患者，平均提前 39min 出院(95%置信區間，2-75;P=.038)。兩組患者在實際出院前基本滿足出院標準。全麻患者離開手術室 1 小時後休息疼痛評分較高(調整均值差異，2.1[95%置信區間，1.0-3.2];P<.001)。次要結果提示(包括阿片類藥物的使用、阿片類藥物的副作用、噁心、頭痛、喉痛和背部疼痛)沒有顯著差異。

結論：全身麻醉與更早的準備出院有關，但這種差異可能在臨床上並不顯著，也

不會導致更早的實際出院。大多數次要結果在組間沒有差異。椎管內麻醉或全身麻醉作為周圍神經阻滯的輔助選擇與否，可反映患者、臨床醫生和醫療機構的偏好。

（羅琨 譯　陳傑 校）

BACKGROUND: Neuraxial anesthesia is often viewed as superior to general anesthesia but may delay discharge. Comparisons do not typically use multimodal analgesics and nerve blockade. Combining nerve blockade with general anesthesia may reduce pain, opioid consumption, and nausea. We hypothesized that general anesthesia (with nerve blocks) would lead to earlier readiness for discharge, compared to spinal anesthesia (with nerve blocks).
METHODS: All patients underwent ambulatory foot and ankle surgery, with a predicted case duration of 1-3 hours. All patients received popliteal and adductor canal nerve blocks using bupivacaine and dexamethasone. No intraoperative opioids were administered. All patients received ondansetron, dexamethasone, ketamine, and ketorolac. Patients, data collectors, and the data analyst were not informed of group assignment. Patients were randomized to spinal or general anesthesia with concealed allocation. Spinal anesthesia was performed with mepivacaine and accompanied with propofol sedation. After general anesthesia was induced with propofol, a laryngeal mask airway was inserted, followed by sevoflurane and propofol. Time until ready for discharge, the primary outcome, was compared between groups after adjusting for age and surgery time using multivariable unconditional quantile regression. Secondary outcomes compared at multiple timepoints were adjusted for multiple comparisons using the Holm-Bonferroni step-down procedure.
RESULTS: General anesthesia patients were ready for discharge at a median of 39 minutes earlier (95% confidence interval, 2-75; P = .038) versus spinal anesthesia patients. Patients in both groups met readiness criteria for discharge substantially before actual discharge. Pain scores at rest were higher among general anesthesia patients 1 hour after leaving the operating room (adjusted difference in means, 2.1 [95% confidence interval, 1.0-3.2]; P < .001). Other secondary outcomes (including opioid use, opioid side effects, nausea, headache, sore throat, and back pain) were not different.
CONCLUSIONS: General anesthesia was associated with earlier readiness for discharge, but the difference may not be clinically significant and did not lead to earlier actual discharge. Most secondary outcomes were not different between groups. The choice of spinal or general anesthesia as an adjunct to peripheral nerve blockade can reflect patient, clinician, and institutional preferences.

肺複張法和可變性通氣聯合應用可以減少麻醉中的肺部健康大鼠的組織損傷和肺部炎症

Variable Ventilation Associated With Recruitment Maneuver Minimizes Tissue Damage and Pulmonary Inflammation in Anesthetized Lung-Healthy Rats

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背景：肺複張法和呼氣末正壓通氣（PEEP）可以用來治療圍術期麻醉相關肺不張。可變性通氣模式可避免使用單一的潮氣量來穩定呼吸力學，並且通過可變的潮氣量完成肺複張保護肺實質。

方法：對 49 只雄性大鼠（每組 7 只）進行麻醉和機械通氣。採用逐步減少呼氣末正壓值的複張法，同時採用最小二乘法持續評估呼吸系統力學。複張以後，繼續採用容量控制通氣模式或可變容量通氣模式進行機械通氣 2 小時。呼吸末正壓設置為與最小肺部回彈相適應的數值或 2cm H2O 左右。對實驗大鼠的肺進行組織學分析（左肺）和細胞因數測量（右肺）。7 只大鼠第一次複張後被進行安樂死作為對照。

結果：呼吸系統彈性隨著時間增加，並被呼氣末正壓通氣顯著減少（P < .001）。可變性通氣減弱促炎介質包括中性粒細胞因數介導中性粒細胞趨化因數-1 (VV = 40 ± 5 and VCV = 57 ± 8 pg/mg; P < .0001)和白細胞介素-1β (VV = 59 ± 25 and VCV = 261 ± 113 pg/mg; P < .0001)在肺實質的聚集。可變性通氣也可以降低肺實質結構的損傷，降低所有機械通氣動物的背部和尾部肺的空氣分數（P < .001）。

結論：在採用呼氣末正壓通氣時，可變性通氣模式比傳統的通氣模式具有更好的保護作用。

（黃思銘 譯 陳傑 校）

BACKGROUND: Recruitment maneuver and positive end-expiratory pressure (PEEP) can be used to counteract intraoperative anesthesia-induced atelectasis.

Variable ventilation can stabilize lung mechanics by avoiding the monotonic tidal volume and protect lung parenchyma as tidal recruitment is encompassed within the tidal volume variability.
METHODS: Forty-nine (7 per group) male Wistar rats were anesthetized, paralyzed, and mechanically ventilated. A recruitment maneuver followed by stepwise decremental PEEP titration was performed while continuously estimating respiratory system mechanics using recursive least squares. After a new recruitment, animals were ventilated for 2 hours in volume-control with monotonic (VCV) or variable (VV) tidal volumes. PEEP was adjusted at a level corresponding to the minimum elastance or 2 cm H2O above or below this level. Lungs were harvested for histologic analysis (left lung) and cytokines measurement (right lung). Seven animals were euthanized before the first recruitment as controls.
RESULTS: A time-dependent increase in respiratory system elastance was observed and significantly minimized by PEEP ($P < .001$). Variable ventilation attenuated the amount of concentrations of proinflammatory mediators in lung homogenate: neutrophil cytokine-induced neutrophil chemoattractant 1 (VV = 40 ± 5 and VCV = 57 ± 8 pg/mg; $P < .0001$) and interleukin-1β (VV = 59 ± 25 and VCV = 261 ± 113 pg/mg; $P < .0001$). Variable ventilation was also associated with lower structural lung parenchyma damage. Significant reductions in air fraction at dorsal and caudal lung regions were observed in all ventilated animals ($P < .001$).
CONCLUSIONS: Variable ventilation was more protective than conventional ventilation within the applied PEEP levels.

一種體外心臟灌注期間利用超聲心動評估左心室功能的新裝置

Description of a Novel Set-up for Functional Echocardiographic Assessment of Left Ventricular Performance During Ex Vivo Heart Perfusion

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體外心臟灌注(EVHP)是一種旨在減少冷缺血時間和在移植供心之前評估心臟功能的新技術。在實驗性 EVHP 豬模型中，我們測試了一個 3D 列印定制裝置，以便在左心室充血期對孤立跳動的心臟進行表面超聲心動檢查。在任何時間點獲得的圖像都等同於標準的經食道和經胸圖像。在所有實驗中都觀察到 EVHP 期間左心室功能下降。

(吳潔譯 李士通校)

Ex vivo heart perfusion (EVHP) is a new technology aimed at decreasing cold ischemia time and evaluating cardiac function before transplanting a donor heart. In an experimental EVHP swine model, we tested a 3D-printed custom-made set-up to perform surface echocardiography on an isolated beating heart during left ventricular loading. The views obtained at any time point were equivalent to standard transesophageal and transthoracic views. A decrease in left ventricular function during EVHP was observed in all experiments.

為提高女性患者甲狀腺手術麻醉後復蘇品質而術中靜脈應用利多卡因和鎂劑

Intravenously Administered Lidocaine and Magnesium During Thyroid Surgery in Female Patients for Better Quality of Recovery After Anesthesia

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背景：雖然靜脈應用利多卡因和鎂劑作為圍手術期鎮痛的輔助用藥已獲得廣泛研究，但對同等條件下復蘇品質缺乏有效評估。我們比較了女性患者甲狀腺切除手術期間靜脈應用利多卡因、鎂劑或生理鹽水的復蘇品質 40（QoR-40）評分，以探討它們對麻醉後恢復的綜合影響。

方法：在這項前瞻性雙盲試驗中，135 名女性患者被隨機分配至利多卡因組（L 組）、鎂劑組（M 組）或對照組（C 組）。誘導後，L 組立即給予利多卡因（2mg/kg 15 分鐘緩慢注射後 2mg/kg/h 持續泵注），M 組給予硫酸鎂（20mg/kg 超過 15 分鐘的速度緩慢注射後 20mg/kg/h 持續泵注）。C 組給予等量生理鹽水。在術後第 1 天和第 2 天進行 QOR-40 的調查。

結果：QoR-40 術後第 1 天總平均分 L 組為 186.3（標準差，5.5），M 組為 184.3（4.7），C 組為 179.4（17.8），僅 L 組與 C 組有顯著性差異（平均差 6.9；調整後 P=0.018）。在 QOR-40 評分的 5 個分級中，L 組的情緒狀態、軀體舒適度和疼痛感覺均優於 C 組。

結論：以 QoR-40 評分作為測量標準，麻醉期間靜脈應用利多卡因患者的術後復蘇品質明顯優於對照組。本研究發現中術中使用鎂劑對復蘇治療無明顯改善。

（韓穆佳譯 李士通校）

BACKGROUND: Although systemic lidocaine and magnesium have been widely studied as perioperative analgesic adjuvants, they have been rarely evaluated with respect to recovery quality under the same conditions. We compared the quality of recovery 40 (QoR-40) scores of female patients who received intravenous lidocaine, magnesium, and saline during thyroidectomy to investigate their effects on comprehensive recovery from anesthesia.
METHODS: In this prospective, double-blind trial, 135 female patients scheduled for open thyroidectomy were randomly assigned to the lidocaine group (group L), magnesium group (group M), or control group (group C). Immediately after induction, lidocaine (2 mg/kg for 15 minutes followed by 2 mg/kg/h) was administered in group L and magnesium sulfate (20 mg/kg over 15 minutes followed by 20 mg/kg/h) was administered in group M. Group C received an equivalent volume of saline. The QoR-40 survey was conducted on postoperative days 1 and 2.
RESULTS: The mean global QoR-40 scores on postoperative day 1 were 186.3 (standard deviation, 5.5) in group L, 184.3 (4.7) in group M, and 179.4 (17.8) in group C, and there was a significant difference only between group L and group C (mean difference, 6.9; adjusted $P = .018$). Among the 5 dimensions of QoR-40, emotional state, physical comfort, and pain were superior in group L compared to group C.
CONCLUSIONS: Lidocaine administered intravenously during anesthesia led to better quality of postoperative recovery measured by QoR-40 compared with the group C. Magnesium was found to be insufficient to induce any significant improvement with the dose used in the present study.

非心臟手術前連續服用血管緊張素轉換酶抑制劑或血管緊張素受體抑制劑相關轉歸的系統回顧

A Systematic Review of Outcomes Associated With Withholding or Continuing Angiotensin-Converting Enzyme Inhibitors and Angiotensin Receptor Blockers Before Noncardiac Surgery

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背景：全球非心臟外科手術的比率每年都在增加，而在那些接受手術的患者中，越來越多的人正在服用血管緊張素轉換酶抑制劑（ACE-I）或血管緊張素受體阻

滯劑（ARB）。 目前關於是否在圍手術期繼續使用或停用 ACE-I 和 ARB 的建議是存在爭議的。 以前的 meta 分析認為術前使用 ACE-I / ARB 治療與誘導後低血壓的發生有關係; 然而，他們未能將此與患者的不良後果聯繫起來。 這項 meta 分析的目的是確定圍手術期持續服用或停用 ACE-I 或 ARB 治療是否與患者死亡率和主要併發症有關。

方法：這項 meta 分析在 PROSPERO（CRD42017055291）上進行了前瞻性登記。 2016 年 12 月 6 日對 MEDLINE（PubMed），CINAHL（EBSCO 宿主），ProQuest，Cochrane 資料庫，Scopus 和 Web of Science 進行了全面檢索。我們將那些平常慢性服用 ACE-I 或 ARB 治療的接受過非心臟手術的 18 歲以上成年人納入了研究範圍，手術當天 ACE-I 或 ARB 被繼續服用或者暫停。主要結果包括各種原因所致的死亡率和主要不良心血管事件（MACE）。 次要結果包括充血性心力衰竭、急性腎損傷、中風、術中/術後低血壓和住院時間延長的風險。

結果：經過抽象審查，檢索了 25 項研究的全文，其中 9 項符合納入標準：5 項為隨機對照試驗，4 項為佇列研究。這些研究包含了在行非心臟手術前慢性服用 ACE-I 或 ARB 的 6022 名患者。其中 1816 名患者在數日清晨停用 ACEI 或 ARB 治療，4206 名患者繼續接受該治療。 兩組術前人口統計學相似。 停用 ACE-I / ARB 治療與死亡率（比值比[OR]，0.97; 95％可信區間[CI]，0.62-1.52;＆nbsp; I ＆nbsp; 2＆nbsp; = 0％）或（主要不良心血管事件）MACE（OR ，1.12; 95％CI，0.82-1.52;＆nbsp; I＆nbsp; 2＆nbsp; = 0％）無顯著差異。 然而，停用治療與術中低血壓顯著降低相關（OR，0.63; 95％CI，0.47-0.85; I＆nbsp; 2＆nbsp; = 71％）。 沒有關於住院時間和充血性心力衰竭的影響估計。

結論：這項 meta 分析並未證明圍手術期服用 ACE-I / ARB 與死亡率或 MACE 之

間存在關聯。 然而，它證實了目前觀察到圍手術期繼續使用 ACE-I / ARB 與術中低血壓的發生率增加有關。一項大型的隨機對照試驗對於確定 ACE-I 和 ARB 的適當圍手術期處理是必不可少的。

（蔣湘雲譯 李士通校）

BACKGROUND: The global rate of major noncardiac surgical procedures is increasing annually, and of those patients presenting for surgery, increasing numbers are taking either an angiotensin-converting enzyme inhibitor (ACE-I) or an angiotensin receptor blocker (ARB). The current recommendations of whether to continue or withhold ACE-I and ARB in the perioperative period are conflicting. Previous meta-analyses have linked preoperative ACE-I/ARB therapy to the increased incidence of postinduction hypotension; however, they have failed to correlate this with adverse patient outcomes. The aim of this meta-analysis was to determine whether continuation or withholding ACE-I or ARB therapy in the perioperative period is associated with mortality and major morbidity.

METHODS: This meta-analysis was prospectively registered on PROSPERO (CRD42017055291). A comprehensive search of MEDLINE (PubMed), CINAHL (EBSCO host), ProQuest, Cochrane database, Scopus, and Web of Science was conducted on December 6, 2016. We included adult patients >18 years of age on chronic ACE-I or ARB therapy who underwent noncardiac surgery in which ACE-I or ARB was either withheld or continued on the morning of surgery. Primary outcomes included all-cause mortality and major cardiac events (MACE). Secondary outcomes included the risk of congestive heart failure, acute kidney injury, stroke, intraoperative/postoperative hypotension, and the length of hospital stay.

RESULTS: After abstract review, the full text of 25 studies was retrieved, of which 9 fulfilled the inclusion criteria: 5 were randomized control trials, and 4 were cohort studies. These studies included a total of 6022 patients on chronic ACE-I/ARB therapy before noncardiac surgery. A total of 1816 patients withheld treatment the morning of surgery and 4206 continued their ACE-I/ARB. Preoperative demographics were similar between the 2 groups. Withholding ACE-I/ARB therapy was not associated with a difference in mortality (odds ratio [OR], 0.97; 95% confidence interval [CI], 0.62–1.52; $I^2 = 0\%$) or MACE (OR, 1.12; 95% CI, 0.82–1.52; $I^2 = 0\%$). However, withholding therapy was associated with significantly less intraoperative hypotension (OR, 0.63; 95% CI, 0.47–0.85; $I^2 = 71\%$). No effect estimate could be pooled concerning length of hospital stay and congestive heart failure.

CONCLUSIONS: This meta-analysis did not demonstrate an association between perioperative administration of ACE-I/ARB and mortality or MACE. It did, however, confirm the current observation that perioperative continuation of ACE-I/ARBs is associated with an increased incidence of intraoperative hypotension. A large randomized control trial is necessary to determine the appropriate perioperative management of ACE-I and ARBs.

4. 中國某婦產醫院剖宮產時有針對性的進行血液回收與輸同種異體血之間的關係

The Association of Targeted Cell Salvage Blood Transfusion During Cesarean Delivery With Allogeneic Packed Red Blood Cell Transfusions in a Maternity Hospital in China

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背景：儘管證實資料有限，但術中自體血細胞回輸是減少剖宮產術後異體紅細胞輸注的方法。本研究評估了中國寧波婦幼醫院高危出血風險產婦剖宮產術中實施術中自體血細胞回輸的情況。

方法：所有孕期>28 周剖宮產婦都被納入研究。使用間斷時間序列分析對術中自體血回收實施前（2010 年 10 月 1 日至 2012 年 8 月 31 日，n = 11,322）與實施後（2012 年 9 月 1 日至 2015 年 6 月 30 日，n=17456）階段進行比較。在實施後階段，共有懷疑需要輸血風險增加的婦女（1604，9.2%）接受了術中自體血回輸。本實驗的主要結果為同種異體紅細胞的月使用率和急性輸血反應的發生率。

結果：57 個月研究結束時，同種異體紅細胞月輸注率的平均值（標準差）為 2.2%±0.7%，與未實施的 2.7%±0.9%相比，差異有顯著性-0.5%，95%CI，-1.4%～0.3%，P=22.每例患者平均輸注異體紅細胞量為 4.1±0.4u，實施後為 3.9±0.9u，差異 0.2、95%CI，-1.7～1.1u，P=.69。術中自體血回收且使用的有 757 例（47%），另有 847 例（53%）的自體血浪費。實施後的同種異體紅細胞月使用率低（差異_0.7%，95%CI，0.1%到_1.4%，P=0.03），但產後同種異體紅細胞月使用率無明顯變化（差異-0.2%，95%CI，0.4%到 0.7%，P=.56）。臨床表現為急性輸血反應的發生率的各時段間無顯著差異（差異-2%，95%CI，-9%~57%，P=.55）。

結論：我們的研究結果提示，在女性剖宮產手術中，有針對性的術中自體血回收與手術室中較少的同種異體血暴露有關，但與術後時期無關。目標剖宮產術中的紅細胞回收與住院期間較少的同種異體紅細胞暴露無關。與術中自體血回收相關的不良事件的缺乏支持了剖宮產術中自體血回收的安全性。

（陶強譯 李士通校）

BACKGROUND: Autologous transfusion of intraoperative cell salvage blood may be a potential method to decrease the need for allogeneic packed red blood cell transfusions after cesarean delivery, although there are limited data on the benefits of this method. This study evaluated the implementation of targeted intraoperative cell salvage during cesarean delivery in women at increased risk for hemorrhage at the Women's and Children's Hospital in Ningbo, China.

METHODS: All women who underwent cesarean delivery >28 weeks of gestation were included in the study. The period before intraoperative cell collection (October 1, 2010, to August 31, 2012, n = 11,322) was compared with the postimplementation period (September 1, 2012, to June 30, 2015, n = 17,456) using an interrupted time series analysis. In the postimplementation period, women suspected to be at increased risk of the need for a blood transfusion (1604, 9.2%) underwent intraoperative cell salvage collection. The primary outcomes were the monthly rate of allogeneic packed red blood cell use and the incidence of clinical manifestation of acute blood transfusion reactions.

RESULTS: The mean (standard deviation) estimated monthly allogeneic packed blood cell transfusion rate at the end of the 57-month study was 2.2% ± 0.7% with the implementation compared with 2.7% ± 0.9% without, difference −0.5%, 95% CI, −1.4% to 0.3%; *P* = .22. The mean number of allogeneic units transfused per patient was 4.1 ± 0.4 units with implementation and 3.9 ± 0.9 units without, difference 0.2, 95% CI, −1.7 to 1.1 units; *P* = .69. Intraoperative cell salvage blood was reinfused in 757 (47%) and wasted in 847 (53%) cases. The monthly intraoperative allogeneic packed red blood cells use rate was lower after implementation (difference −0.7%, 95% CI, −0.1% to −1.4%; *P* = .03); however, the monthly postpartum allogeneic packed red blood cell use rate was unchanged (difference −0.2%, 95% CI, −0.4% to 0.7%; *P* = .56). The clinical manifestation of acute blood transfusion reactions rate was unchanged (difference −2%, 99% CI, −9% to 5%; *P* = .55) between the periods.

CONCLUSIONS: Our findings suggest that targeted intraoperative cell salvage in women undergoing cesarean delivery was associated with less allogeneic blood exposure in the operating room, but not in the postoperative period. Intraoperative cell salvage in targeted cesarean deliveries was not associated with a lesser allogeneic red blood cell exposure over the hospital admission period. The lack of adverse events associated with intraoperative cell salvage supports the safety of intraoperative cell salvage in cesarean delivery.

美國東南部人群圍麻醉期與麻醉相關死亡率：前瞻性收集的品質保證資料庫的縱向回顧

Perianesthetic and Anesthesia-Related Mortality in a Southeastern United States Population: A Longitudinal Review of a Prospectively Collected Quality Assurance Data Base

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背景：圍麻醉期死亡率(在麻醉後 48 小時內發生的死亡率)根據研究物件的不同一直存在很大的差異。作者在一個私人執業醫師小組進行研究，該小組覆蓋了美國東南部多個麻醉場所。該小組有一個健全的品質保證(QA)資料庫跟蹤所有接受麻醉的病人。通過這項研究，我們估計了在這個 QA 資料庫中與麻醉相關和圍麻醉期死亡率的發生率。

方法：經過機構審查委員會的批准，2011 年至 2016 年的資料來自一個大型的基於社區的麻醉學團體實踐的 QA 資料庫。該醫師執業範圍涵蓋了 233 個麻醉場所，遍佈美國 2 個州的 20 個設施。所有發現的麻醉死亡病例均從資料庫中提取，並與患者的電子病歷進行比較。這些病例由 3 名麻醉師組成的委員會進一步檢查，以確定死亡是否與麻醉有關(僅由麻醉提供者或麻醉提供者造成的圍手術期死亡)。

結果：研究期間共檢查了 785,467 例麻醉手術。共檢出 592 例麻醉死亡，10 萬例總死亡率為 75.37 例(95% CI, 69.5-81.7)。4 例患者死亡判定為麻醉相關，死亡率為 0.509 / 100,000 (95% CI 0.198-1.31)。18 例死亡被判定為麻醉導致的，死亡率為 2.29 / 10 萬(95% CI, 1.45-3.7)。總共有 570 例被判定為非麻醉相關，每 10 萬名麻醉藥中有 72.6 例(95 例)。

結論：在一個代表美國東南部所有麻醉實踐和地點的大型綜合資料庫中，麻藥死亡率為 10 萬分之 0.509(95%可信區間為 0.198-1.31)。關於麻醉死亡流行病學的進一步深入分析將在以後的研究中報導。

(方怡嬌譯 李士通校)

BACKGROUND: Perianesthetic mortality (death occurring within 48 hours of an anesthetic) continues to vary widely depending on the study population examined. The authors study in a private practice physician group that covers multiple anesthetizing locations in the Southeastern United States. This group has in place a robust quality assurance (QA) database to follow all patients undergoing anesthesia. With this study, we estimate the incidence of anesthesia-related and perianesthetic mortality in this QA database.

METHODS：Following institutional review board approval, data from 2011 to 2016 were obtained from the QA database of a large, community-based anesthesiology group practice. The physician practice covers 233 anesthetizing locations across 20 facilities in 2 US states. All detected cases of perianesthetic death were extracted from the database and compared to the patients' electronic medical record. These cases were further examined by a committee of 3 anesthesiologists to determine whether the death was anesthesia related (a periopera tive death solely attributable to either the anesthesia provider or anesthetic technique), anesthetic contributory (a perioperative death in which anesthesia role could not be entirely excluded), or not due to anesthesia.

RESULTS: A total of 785,467 anesthesia procedures were examined from the study period. A total of 592 cases of perianesthetic deaths were detected, giving an overall death rate of 75.37 in 100,000 cases (95% CI, 69.5–81.7). Mortality judged to be anesthesia related was found in 4 cases, giving a mortality rate of 0.509 in 100,000 (95% CI, 0.198–1.31). Mortality judged to be anesthesia contributory were found in 18 cases, giving a mortality of 2.29 in 100,000 patients (95% CI, 1.45–3.7). A total of 570 cases were judged to be nonanesthesia related, giving an incidence of 72.6 per 100,000 anesthetics (95% CI, 69.3–75.7).

CONCLUSIONS: In a large, comprehensive database representing the full range of anesthesia practices and locations in the Southeastern United States, the rate of perianesthestic death was 0.509 in 100,000 (95% CI, 0.198–1.31). Future in-depth analysis of the epidemiology of perianesthetic deaths will be reported in later studies.

6. 促進限制性術中輸血的策略：輸血指南和新型軟體工具的影響

Promoting a Restrictive Intraoperative Transfusion Strategy: The Influence of a Transfusion Guideline and a Novel Software Tool

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背景：輸血指南和決策支援工具在手術中輸血的效果以前都沒有評估。本研究的主要目的是評估輸血指南和軟體輸血工具的可選使用與術中行為、輸血前紅細胞壓積評估(在每個紅細胞單元之前是否檢查紅細胞壓積)和限制性紅細胞的關係。細胞使用（除非血細胞比容小於 21%）停止輸血。密西根大學在 2009 年引入了輸血指導方針，2011 年麻醉學系開發了輸血決策支援工具。

方法：這是一項術前後回顧性研究，其中沒有術中輸注 1-3 個單位紅細胞的患者作為對照組。研究三個階段以提供輸血指南和術中軟體工具實施前後的資料。在每個階段，檢查輸血前的血細胞比容和限制性輸血的趨勢是隨時間變化的。採用 F 檢驗法測量坡度差異。使用 Mann-Whitney U 檢驗測量各相的平均值之間的差異。使用混合效應多變數 logistic 回歸測量獨立關聯。對 30 天死亡率、心肌梗死、腎損傷及其組合進行二級結果分析。

結果：輸血指南與輸血前紅細胞壓積評價（67.4%，標準差[SD]3.9 比 76.5%，SD 2.7；P<0.001）和限制性輸血實踐（14.0%，SD 7.4 比 33.3%，SD 4.4；P=0.001）相關。調整混雜因素後，指導階段與紅細胞壓積檢查（優勢比，1.72；95%置信區間，1.46-2.03；P<0.001）和限制性紅細胞輸注（優勢比，2.95；95%置信區間，2.46-3.54；P<0.001）獨立相關。軟體工具與輸血行為無關。腎損傷率（16.06%）、心肌損傷（4.93%）、30 天死亡率（5.47%）或複合物（21.90%）無顯著變化。

結論：輸血指南的引入與術中輸血前紅細胞壓積的評估和限制性輸血的獨立相關。軟體工具的使用並沒有進一步影響任何行為。

（韓穆佳譯 李士通校）

BACKGROUND: The effect of neither transfusion guidelines nor decision support tools on intraoperative transfusion has been previously evaluated. The University of Michigan introduced a transfusion guideline in 2009, and in 2011, the Department of Anesthesiology developed a transfusion decision support tool. The primary aim of this study was to assess the associations of the transfusion guideline and the optional use of the software transfusion tool with intraoperative behaviors; pretransfusion hematocrit assessment (whether or not a hematocrit was checked before each red cell unit) and restrictive red cell use (withholding transfusion unless the hematocrit was ≤21%).

METHODS: This was a before–after retrospective study without a concurrent control group of patients transfused 1–3 units of red cells intraoperatively. Three phases were studied to provide data both before and after the implementation of the transfusion guideline and the intraoperative software tool. Within each phase, trends of checking hematocrits before transfusion and restrictive transfusion were charted against time. F tests were used to measure differences of slopes. The difference between means of each phase was measured using Mann-Whitney *U* tests. Independent associations were measured using mixed-effects multivariable logistic regression. A secondary outcome analysis was conducted for 30-day mortality, myocardial infarction, renal injury, and their combination.

RESULTS: The transfusion guideline was associated with increased pretransfusion hematocrit evaluation (67.4%, standard deviation [SD] 3.9 vs 76.5%, SD 2.7; $P < .001$) and restrictive transfusion practice (14.0%, SD 7.4 vs 33.3%, SD 4.4; $P = .001$). After adjustment for confounders, the guideline phase was independently associated with increased hematocrit checking (odds ratio, 1.72; 95% confidence interval, 1.46–2.03; $P < .001$) and restrictive red cell transfusion (odds ratio, 2.95; 95% confidence interval, 2.46–3.54; $P < .001$). The software tool was not associated with either transfusion behavior. There was no significant change in the rate of renal injury (16.06%), myocardial injury (4.93%), 30-day mortality (5.47%), or a composite (21.90%).

CONCLUSIONS: The introduction of a transfusion guideline was independently associated with increased intraoperative pretransfusion hematocrit assessment and restrictive transfusion. The use of a software tool did not further influence either behavior.

阿片類藥物濫用和術後肺部併發症的風險

Opioid Use Disorders and the Risk of Postoperative Pulmonary Complications

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背景： 隨著阿片類藥物濫用的與日俱增，圍手術期醫生為手術後患者提供鎮痛

面臨著越來越多的挑戰。由於阿片類藥物使用劑量在圍手術期可能增加，我們假設阿片類藥物依賴患者發生術後肺部併發症的風險增加。

方法： 我們從全國住院病人樣本中選取 2002 年至 2011 年期間的 6 種具有代表性的擇期手術患者進行回顧性橫斷面分析。主要結果包括延長的機械通氣、再插管和急性呼吸衰竭。次要結果是住院時間、住院死亡率和總住院費用。多變數 logistic 回歸和傾向評分匹配都被用來確定阿片類藥物濫用對結果的影響。

結果：總樣本加權佇列包括 7533050 名患者。阿片類藥物濫用患者更容易患肺部併發症，發生率為 4.2%，而非阿片類依賴組為 1.6%（P <0.001），並且，在多變數回歸分析中，阿片類藥物濫用患者發生風險的可能性高出對照組 1.62 倍（95%可信度[CI]，1.16-2.27）。在次級亞組分析中，只有接受結腸切除術的阿片類藥物濫用患者發生肺部併發症的幾率更高（優勢比，2.64; 95%CI，1.42-4.91; P = 0.0021）。 此外，阿片類藥物濫用患者的住院時間更長（0.84 天[95%CI，0.52-1.16; P <0.001]）和住院費用更高（1816 美元[95% CI, 935-2698; P < 0.001]）。

結論： 本研究表明，阿片類藥物濫用患者發生術後肺部併發症風險增加，住院時間延長，資源利用時間延長。針對降低這類患者併發症風險的干預措施，還需要進行進一步研究。

（毛玉林譯 李士通校）

BACKGROUND: As the rate of opioid use disorders continues to rise, perioperative physicians are increasingly faced with the challenge of providing analgesia to these patients after surgery. Due to the likelihood of opioid dose escalation in the perioperative period, we hypothesized that opioid-dependent patients would be at increased risk for postoperative pulmonary complications.

METHODS: A retrospective cross-sectional analysis of patients undergoing 6 representative elective surgical procedures was performed using the Nationwide Inpatient Sample from 2002 to 2011. The primary outcome was a composite including prolonged mechanical ventilation, reintubation, and acute respiratory failure. Secondary outcomes were length of stay, in-hospital mortality, and total hospital costs.

Both multivariable logistic regression and propensity score matching were used to determine the impact of opioid use disorder on outcomes.
RESULTS: The total sample-weighted cohort consisted of 7,533,050 patients. Patients with opioid use disorders were more likely to suffer pulmonary complications, with a frequency of 4.2% compared to 1.6% in the nonopioid-dependent group ($P < .001$), and had a 1.62 times higher odds (95% confidence interval [CI], 1.16–2.27) in multivariable regression analysis. In a secondary subgroup analysis, only patients undergoing a colectomy had a greater odds of suffering pulmonary complications (odds ratio, 2.64; 95% CI, 1.42–4.91; $P = .0021$). Additionally, patients with an opioid use disorder had a longer length of stay (0.84 days [95% CI, 0.52–1.16; $P< .001$]) and greater costs ($1816 [95% CI, 935–2698; $P < .001$]).
CONCLUSIONS: This study demonstrates that patients with opioid use disorders are at increased risk for postoperative pulmonary complications, and have prolonged length of stay and resource utilization. Further research is needed regarding interventions to reduce the risk of complications in this subset of patients.

生存分析和時間-事件資料解釋:龜與兔

Survival Analysis and Interpretation of Time-to-Event Data: The Tortoise and the Hare

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生存分析，或者更通俗地說，時間-事件分析，指的是一組分析直到出現一個明確定義終點的時間長度的方法。生存資料的一個獨特特徵是，通常不是所有的患者在觀察期結束時都經歷過這個事件(如死亡)，因此一些患者的實際生存時間是未知的。這種現象，被稱為審查，必須在分析中進行解釋，才能做出有效的推論。此外，生存時間通常是傾斜的，限制了假定正常資料分佈的分析方法的有效性。作為正在進行的《麻醉與鎮痛》系列的一部分，本教程回顧了適用於分析事件時間資料的統計方法，包括非參數和半參數方法，特別是 Kaplan-Meier 估計、log-rank 核對總和 Cox 比例風險模型。這些方法是目前醫學文獻中分析這類資料最常用的資料處理方法。從《麻醉與鎮痛》雜誌上發表的研究中，舉例說明了這些技術在實踐中是如何使用的，簡要討論了全參數模型和處理特殊情況的模型，如重複事件模型、競爭風險模型和衰弱模型。

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Survival analysis, or more generally, time-to-event analysis, refers to a set of methods for analyzing the length of time until the occurrence of a well-defined end point of interest. A unique feature of survival data is that typically not all patients experience the event (eg, death) by the end of the observation period, so the actual survival times for some patients are unknown. This phenomenon, referred to as censoring, must be accounted for in the analysis to allow for valid inferences. Moreover, survival times are usually skewed, limiting the usefulness of analysis methods that assume a normal data distribution. As part of the ongoing series in *Anesthesia & Analgesia* , this tutorial reviews statistical methods for the appropriate analysis of time-to-event data, including nonparametric and semiparametric methods—specifically the Kaplan-Meier estimator, log-rank test, and Cox proportional hazards model. These methods are by far the most commonly used techniques for such data in medical literature. Illustrative examples from studies published in *Anesthesia & Analgesia* demonstrate how these techniques are used in practice. Full parametric models and models to deal with special circumstances, such as recurrent events models, competing risks models, and frailty models, are briefly discussed.