妊娠期纖維蛋白原的床旁檢測

Point-of-Care Fibrinogen Testing in Pregnancy

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Anesthesia & Analgesia: 2019 129 e86-e88

通過血栓彈力圖和傳統實驗方法估計的產婦的纖維蛋白原濃度的一致性還未被確定。因此，我們招募了 56 名產婦，用克勞斯法和功能性纖維蛋白原水準測試進行了檢測。檢測結果的平均差為 36.8mg/dL（95%置信區間，-40.8—-92.5），標準差為 52.8mg/dL。一致性的計算限值為 140.2mg/dL（95%置信區間，166.3—114.6）和-66.6mg/dL（95%置信區間，-40.8—-92.5），最大允許差值為 165mg/dL。因此，我們得出結論，雖然大多數測量結果都在一致範圍內，我們仍需要進行工多工作來確定這項測試在產科人群中的作用。

（吳兆藝譯 潘豔、薛張綱校）

Agreement between estimated fibrinogen concentration via thromboelastography and traditional assays is not established in the parturient. We therefore recruited 56 parturients and performed Clauss and functional fibrinogen level (FLEV) tests. Mean difference of measurements was 36.8 mg/dL (95% CI, 21.8-51.9) with a standard deviation of 52.8 mg/dL. Calculated limits of agreement were 140.2 mg/dL (95% CI, 166.3-114.6) and -66.6 mg/dL (95% CI, -40.8 to -92.5), within the maximum allowable difference of 165 mg/dL. We therefore conclude that while most measurements fell within the limits of agreement, more work is needed to clearly define the role of this test in the obstetric population.

無干擾的誘導區域:一家大型研究型兒童醫院內一項用以提升病人麻醉品質和安全的品質改進措施

Distraction-Free Induction Zone: A Quality Improvement Initiative at a Large Academic Children’s Hospital to Improve the Quality and Safety of Anesthetic Care for Our Patients

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Anesthesia & Analgesia: 2019 129 794-803

背景：手術室內的噪音可能在關鍵時刻導致分心，並影響醫務人員之間的交流。實施麻醉誘導時，即使只是片刻的注意力分散也可以導致錯誤和嚴重的後果。對於一名麻醉醫生來說，在關鍵時刻例如誘導或者蘇醒時的分心關乎著病人的性命安全。出於對全麻誘導期間不可接受的噪音水準和注意力分散程度的關注，我們的研究機構提出了一項改進醫療品質的措施——建立無干擾的誘導環境。該研究的具體目標是在兒童耳鼻喉科手術室內使得干擾醫務人員注意力的事件如播放的音樂、不必要的交流、吵鬧的雜訊等，的發生率從 61%降至 15%。

方法：為了實施這項研究，一個多學科團隊使用了改善科學方法，其中包括了使用 Plan-Do-Study-Act 迴圈圈進行檢測干預措施改善的模型。我們使用了不同的工具，例如 Key Driver Diagram, Pareto Charts, Process Flow Chart, Plan-Do-Study-Act 等工作表。資料由人工進行收集並且每週一次輸入至 Excel 表格。統計分析採用的統計程序控制方法包括了運行表格和 P 值控制表格。研究的測量結局是一種複合測量，即在全麻誘導過程中觀察三件導致分心的事情之一。

結果：我們實施並利用 Plan-Do-Study-Act 迴圈圈測試了幾項干預措施，其中三項主要措施在全麻誘導期間被觀察到和分心事件發生率的下降有關。這些措施包括：教育手術室內的醫務人員，幫助他們理解麻醉醫生的注意力集中和病人安全高度相關；巡迴護士應該承擔暫停手術室內的任何音樂的責任；麻醉醫生應提醒手術室內的人員誘導的時刻，如果存在分散注意力的情形時應要求安靜。在兒童耳鼻喉科手術室內，全麻誘導期間引起注意力分散的事件發生率截止 2017 年 4 月 15 日從 61%降至了 15%，截止 2017 年 6 月 4 日，發生率降至 10%。

結論：利用改進科學方法，我們在全麻誘導期間觀察到影響注意力集中事件發生率的下降，並通過改進過程鼓勵改變從而提升研究型兒童醫院病人的麻醉品質和安全感。

（王沛譯 潘豔、薛張綱校）

BACKGROUND: Noise in the operating room may cause distractions during critical periods andimpair reliable communication between staff. Even momentary inefficiency while administering
anesthesia can lead to errors and serious consequences for the patient. Distractions to an anesthesia provider during critical periods such as induction and emergence are a patient safety issue. Because of concerns regarding unacceptable noise levels and distractions during induction of general anesthesia, our institution developed a quality improvement initiative, the “Distraction-Free Induction Zone.” The specific aim of this project was to decrease the percentage of caseswith a distraction, described as music, unnecessary conversations, or loud noises, occurring duringinduction of general anesthesia in pediatric otolaryngology operating rooms from 61% to 15%.
METHODS: To complete this quality improvement initiative, a multidisciplinary team used improvement science methods, including The Model for Improvement with interventions tested via Plan-Do-Study-Act cycles. We used tools such as the Key Driver Diagram, Pareto Charts, Process Flow Chart,and Plan-Do-Study-Act worksheets. Data were manually collected and entered weekly in an Excel spreadsheet. Statistical process control methods, including a run chart and a P-control chart, were used for data analysis. Our measure was a composite measure in which observation of 1 of the 3 distractions during induction of general anesthesia categorized the case as a case with a distraction.
RESULTS: We tested and implemented several interventions via Plan-Do-Study-Act cycles in which 3 main interventions collectively were associated with an observed decrease in distractions during induction of general anesthesia. These included educating the perioperative staff present inthe operating room to help them understand that distractions to anesthesia providers represent a
patient safety issue, the operating room circulating nurse taking responsibility to pause any musicon arrival to the operating room, and the anesthesiologist reminding the staff in the operating room of induction time and/or asking for quiet during induction if a distraction occurs. The percentageof cases with a distraction during induction of general anesthesia in our pediatric otolaryngology operating rooms decreased from 61% to 15% by April 15, 2017 and to 10%

by June 5, 2017.
CONCLUSIONS: Using improvement science methods, we observed a decrease in distractionsduring induction of general anesthesia, improved a process, and encouraged change in cultureat a large academic children's hospital to enhance the quality and safety of the anesthetic carewe provide our patients.

通過麻醉和重症監護病房服務轉運重症患者：手術室工作流程的前後研究

Transport of Critically Ill Patients by the Anesthesia Versus the Intensive Care Unit Service: A Before-After Study of Operating Room Workflows

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Anesthesia & Analgesia: 2019 129 671-678

背景：本機構實施了一項新政策，即重症監護病房(ICU)患者運送到手術室(OR)的責任從麻醉人員轉為 ICU 人員。我們假設這種方法與準時開始手術時間的增加以及接台時間減少有關。

方法：在傳統模型中，插管患者或機械迴圈輔助（MCA）的患者主要是通過麻醉人員負責運送到 OR（“ICU 前接送”）。但在我們的新模型中，這些患者先通過 ICU 人員轉送到術前等待區域(Pre-op)，再轉到麻醉服務(“ICU 後轉移”)。如果經 ICU 或麻醉科判斷後決定是否需要通過麻醉人員（“ICU 後接送”）運送患者。我們回顧性地審查了新政策之前（2014 年 1 月至 2015 年 5 月）和實施後（2016 年 7 月至 2017 年 6 月）手術患者的病例追蹤數據。主要結果為選擇性、工作日首例且準時開始的病例比例。為了調整包括合併症和時間趨勢在內的混雜因素，我們進行了分段邏輯回歸分析，評估了干預對主要結果的影響。次要結果是接台時間和術前匹配的準確性。

結果：我們在 ICU 前接送組中確定了 95 例首台和 86 例接台病例，在 ICU 後轉移組中確定了 70 例首台和 88 例接台病例，在 ICU 後接送組中確定了 6 例接台病例。

忽略時間趨勢，準時開始手術的原始比例從 ICU 前接送組的 32.6%增加到 ICU 後接送組的 77.1%。經過分段邏輯回歸調整年齡、性別、美國麻醉醫師協會（ASA）身體狀況、序貫器官衰竭評估（SOFA）評分、呼吸衰竭、氣管內插管、MCA、充血性心力衰竭（CHF）、心臟瓣膜病和心源性及出血性休克等情況，ICU 後接送組在干預開始時比 ICU 前接送組在擬干預時更準時開始（比值比，11.1; 95%置信區間，1.3-125.7; P = .043）。在對上述混雜因素進行分段線性回歸調整後，ICU 後接送和 ICU 前接送組之間平均接台時間的估計差異不顯著（-6.9 分鐘; 95%CI，-17.09 至 3.27; P = .17 ）。在 ICU 後接送組患者中，離開 ICU 之前確認了病史、體格檢查（H&P）以及手術部位標記情況的病例，分別為 92.9%，93.2%和 89.2%。整個研究期間未報告任何不良事件。

結論:將 ICU 患者運送到 OR 的服務，從麻醉到 ICU 的過渡並沒有縮短接台時間，但有較多手術準時開始和準確術前資訊匹配的結果。

（李瑋珊譯潘豔、薛張綱校）

BACKGROUND: We implemented a new policy at our institution where the responsibility for intensive care unit (ICU) patient transports to the operating room (OR) was changed from the anesthesia to the ICU service. We hypothesized that this approach would be associated with increased on-time starts and decreased turnover times.

METHODS: In the historical model, intubated patients or those on mechanical circulatory assistance (MCA) were transported by the anesthesia service to the OR ("pre-ICU Pickup"). In our new model, these patients are transported by the ICU service to the preoperative holding area (Pre-op) where care is transferred to the anesthesia service ("post-ICU Transfer"). If judged necessary by the ICU or anesthesia attending, the patient was transported by the anesthesia service ("post-ICU Pickup"). We retrospectively reviewed case tracking data for patients undergoing surgery before (January 2014 to May 2015) and after implementation (July 2016 to June 2017) of the new policy. The primary outcome was the proportion of elective, weekday first-case, on-time starts. To adjust for confounders including comorbidities and time trends, we performed a segmented logistic regression analysis assessing the

effect of our intervention on the primary outcome. Secondary outcomes were turnover times and compliance with preoperative checklist documentation.
RESULTS: We identified 95 first-start and 86 turnover cases in the pre-ICU Pickup, 70 first-start and 88 turnover cases in the post-ICU Transfer, and 6 turnover cases in the post-ICU Pickup group. Ignoring time trends, the crude proportion of on-time starts increased from 32.6% in the pre-ICU Pickup to 77.1% in the post-ICU Transfer group. After segmented logistic regression adjusting for age, sex, American Society of Anesthesiologists (ASA) physical status, Sequential Organ Failure Assessment (SOFA) score, respiratory failure, endotracheal intubation, MCA, congestive heart failure (CHF), valvular heart disease, and cardiogenic and hemorrhagic shock, the post-ICU Transfer group was more likely to have an on-time start at the start of the intervention than the pre-ICU Pickup group at the end of the preintervention period (odds ratio, 11.1; 95% confidence interval [CI], 1.3–125.7; $P = .043$). After segmented linear regression adjusting for the above confounders, the estimated difference in mean turnover times between the post-ICU Pickup and pre-ICU Transfer group was not significant (−6.9 minutes; 95% CI, −17.09 to 3.27; $P = .17$). In post-ICU Transfer patients, consent, history and physical examination (H&P), and site marking were verified before leaving the ICU in 92.9%, 93.2%, and 89.2% of the cases, respectively. No adverse events were reported during the study period.
CONCLUSIONS: A transition from the anesthesia to the ICU service for transporting ICU patients to the OR did not change turnover times but resulted in more on-time starts and high compliance with preoperative checklist documentation.

成人在行全髖或全膝關節置換術時關節周圍酮洛酸的藥代動力學特性

Population Pharmacokinetics of Periarticular Ketorolac in Adult Patients Undergoing Total Hip or Total Knee Replacement Surgery

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Anesthesia & Analgesia: 2019 129 701-708

背景：酮洛酸氨丁三醇作為多模式鎮痛的一部分已被骨科醫生用於關節周圍浸潤。本研究的目的在於探討酮洛酸 S(-)和酮洛酸 R（+）兩種對映體在成人全髖關節置換術（THA）或全膝關節置換術（TKA）患者體內的藥代動力學特性。

方法：對於術前腎功能正常的成人患者，在全髖關節置換（THA）或全膝關節置

換（TKA）手術結束時，給與含有 30mg 酮洛酸氨丁三醇的 0.2%羅呱卡因 100mL 外加 1mg 麻黃素行關節周圍浸潤。在給藥後的不同時間段抽取靜脈血樣本，使用 PMetrics1.5.0 系統建立藥代動力學模型。

結果：從 18 位元實驗物件中獲取並分析了 104 份血樣本。酮洛酸 S(-)比酮洛酸 R（+）血漿藥物峰值濃度低，兩者在全髖關節置換術（THA）的血漿藥物峰值濃度分別為 0.19-1.22mg/L 和 0.39-1.63mg/L，在全膝關節置換（TKA）的血漿藥物峰值濃度分別為 0.28-0.60mg/L 和 0.48-0.88mg/L。酮洛酸 S(-)比酮洛酸 R(+)在體內的清除率高，分別為 4.50±2.27L/h 和 1.40±0.694L/h.

結論：我們的研究結果表明，與酮洛酸 R（+）相比，酮洛酸 S(-)具有更高的體內清除率、變化更大的分佈容積和更低的血漿藥物峰值濃度。

（石平譯 潘豔、薛張綱校）

BACKGROUND: Ketorolac tromethamine has been used for joint infiltration by the orthopedic surgeons as a part of postoperative multimodal analgesia. The objective of this study is to investigate the pharmacokinetic properties of S (-) and R (+) enantiomers of ketorolac in adult patients undergoing total hip (THA) and knee arthroplasty (TKA).
METHODS: Adult patients with normal preoperative renal function received a periarticular infiltration of 30 mg of ketorolac tromethamine along with 100 mL of 0.2% ropivacaine and 1 mg of epinephrine at the end of their THA or TKA surgery. Blood samples were taken from a venous cannula at various time points after infiltration. Pharmacokinetic modeling was performed using PMetrics 1.5.0.
RESULTS: From 18 participants, 104 samples were analyzed. The peak plasma concentration for S (-) ketorolacwas found to be lower than that of R (+) ketorolac, for both THA (0.19-1.22 mg/L vs 0.39-1.63 mg/L, respectively) and TKA (0.28-0.60 mg/L vs 0.48-0.88 mg/L, respectively). The clearance of the S (-) ketorolac enantiomer was higher than R (+) ketorolac (4.50 ± 2.27 vs 1.40 ± 0.694 L/h, respectively).
CONCLUSIONS: Our study demonstrates that with periarticular infiltration, S (-) ketorolac was observed to have increased clearance rate and highly variable volume of distribution and lower peak plasma concentration compared to R (+) ketorolac.

雙側胸椎旁阻滯與胸段硬膜外鎮痛在中線切口腹部手術中的比較:一項實用的非劣效性臨床試驗

Bilateral Thoracic Paravertebral Blocks Compared to Thoracic Epidural Analgesia After Midline Laparotomy: A Pragmatic Noninferiority Clinical Trial.

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Anesthesia & Analgesia: 2019 129 855-863

背景:雙側胸段椎旁阻滯(PVB)是一種可替代胸段硬膜外鎮痛(TEA)用於腹部手術的方法。本隨機臨床試驗旨在確定 PVB 在腹部手術後鎮痛方面是否不劣于於 TEA。

方法:70 名 ASA 分級 I-III,擬行中線切口腹部手術的患者,隨機分配接受胸段硬膜外鎮痛(TEA 組)或連續雙側椎旁阻滯鎮痛 (PVB 組),作為非盲法試驗設計中多模式鎮痛方案的一部分。在 0-10 分的數值評分量表(NRS)中,如果兩組患者術後 24 小時運動疼痛的平均差異在 2 分的範圍內,認為得出非劣效性的結論。術後 72 小時內的休息和運動疼痛評分、鎮痛藥物消耗量、血流動力學和不良事件是評估鎮痛效果的次要指標。PVB 組還記錄了阻滯後、穩態時血漿羅呱卡因濃度和染色擴散模式。

結果:與 TEA 組比較,PVB 組的術後 24 小時運動疼痛評分無顯著性差異(95%置信區間[CI], 0.43[-0.72-1.58])。兩組患者在休息和其他時間點的疼痛評分均在臨床可接受的範圍內,隨著時間的推移,兩組間無顯著差異。34 例患者中有 9 例動脈血漿羅呱卡因水準在安全範圍內,而穩態靜脈水準高於可接受閾值。

結論:雙側胸段椎旁阻滯作為多模式鎮痛的組成部分,與胸段硬膜外鎮痛相比,在中線切口腹部手術中提供非劣性的鎮痛效果。

（王甲利譯 潘豔、薛張綱校）

BACKGROUND: Bilateral paravertebral block (PVB) is a suitable alternative to thoracic epidural analgesia (TEA) for abdominal surgeries. This randomized clinical trial aims to determine if PVB is noninferior to TEA in terms of analgesia after midline laparotomy.
METHODS: Seventy American Society of Anesthesiologists (ASA) class I-III patients undergoing a laparotomy through a midline incision were randomized to receive either TEA (TEA group) or continuous bilateral PVB (PVB group) as a part of a multimodal analgesia regimen in an open-label design. Noninferiority was to be concluded if the mean between-group difference in pain on movement at the 24 postoperative hours was within a margin of 2 points on a 0-10 numerical rating scale (NRS). Pain score at rest and on movement, analgesic consumption, hemodynamics, and adverse events during the first 72 postoperative hours were the secondary outcome measures assessed for superiority. Postblock and steady-state plasma concentrations of ropivacaine and pattern of dye spread were also recorded in the PVB group.
RESULTS: The primary outcome of pain scores on movement at 24 postoperative hours was noninferior in PVB group in comparison to TEA group (mean difference [95% confidence interval {CI}], 0.43 [-0.72-1.58]). The pain scores at rest and on movement at other time points of assessment were within clinically acceptable limits in both groups with no significant differences between the groups over time. Arterial plasma ropivacaine levels were within safe limits, while steady-state venous level was higher than an acceptable threshold in 9 of 34 cases.
CONCLUSIONS: As a component of multimodal analgesia, bilateral PVB provides noninferior analgesia compared to TEA for midline laparotomy.

常用的肌力藥物逆轉膽鹼能性的支氣管收縮：大鼠離體肺灌流的隨機實驗研究

Reversing Cholinergic Bronchoconstriction by Common Inotropic Agents: A Randomized Experimental Trial on Isolated Perfused Rat Lungs

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Anesthesia & Analgesia: 2019 129 745-752

背景：肌力藥物改變氣道反應性和肺組織力學的能力沒有得到比較在一個控制良好的實驗模型中。因此，我們比較了在離體大鼠肺灌流模型中常用的肌力藥物對改變肺組織粘彈性和支氣管擴張作用的可能性。

方法：用乙醯膽鹼（ach）誘導大鼠穩態肺灌注後的持續性支氣管收縮。然後將

分離的大鼠肺隨機分為 6 組，分別用生理鹽水組（n=8）；遞增濃度的肌力藥物腎上腺素組（n=8）；多巴胺組（n=7）；多巴酚丁胺組（n=7）；米力農組（n=8）；或左旋門冬氨酸組（n=6）。將添加劑添加到全血灌流液中。氣道阻力（raw）、肺組織阻尼（g）和彈性在基線條件下被測量，在穩態乙醯膽鹼誘導的支氣管收縮過程中以及在每種肌力藥物作用下。

結果：在生理鹽水組 RAW 未觀察到明顯的變化。和生理鹽水組相比多巴胺組 RAW 顯著降低最大差異[95%CI]為 29[12-46]%，p=0.004）；左旋門冬氨酸組 RAW 下降（58[39-77]%，p<0.001）；腎上腺素組（37[21-53]%，p<0.001））。而任何劑量的米力農和多巴酚丁胺組均未觀察到顯著差異。（5[-12 至 22]%）和（4[-13 至 21]%）。與對照組相比，動物的肺組織阻尼（G）降低接受在最高劑量腎上腺素組（22[7-37]、P=.015）、多巴酚丁胺組（20[5-35]、P=.024）、米力農組（20[6-34]、P=.026）和左旋門冬氨酸組（36[19-53]、P<0.001）。

結論：雖然多巴酚丁胺和米力農不能緩解膽鹼能性的額支氣管收縮，但它們能逆轉乙醯膽鹼誘導的肺組織阻力增高。相反，腎上腺素、多巴胺和左西門冬氨酸對乙醯膽鹼酯酶有很強的支氣管擴張作用，並降低肺組織阻尼。需要進一步的研究來確定這些效應是否與人類的臨床相關。

（王碩 譯 潘豔、薛張綱校）

BACKGROUND: The ability of inotropic agents to alter airway reactivity and lung tissue mechanics has not been compared in a well-controlled experimental model. Therefore, we compared the potential to alter lung tissue viscoelasticity and bronchodilator effects of commonly used inotropic agents in an isolated perfused rat lung model.

METHODS: After achieving steady state lung perfusion, sustained bronchoconstriction was induced by acetylcholine (ACh). Isolated rat lungs were then randomly allocated to 6 groups treated with either saline vehicle (n = 8) or incremental concentrations of inotropes (adrenaline, n = 8; dopamine, n = 7; dobutamine, n = 7; milrinone, n = 8; or levosimendan,

n = 6) added to the whole-blood perfusate. Airway resistance (Raw), lung tissue damping (G), and elastance were measured under baseline conditions, during steady-state ACh-induced constriction and for each inotrope dose.
RESULTS: No change in Raw was observed after addition of the saline vehicle. Raw was significantly lower after addition of dopamine (maximum difference [95% CI] of 29 [12 - 46]% relative to the saline control, P = .004), levosimendan (58 [39 - 77]%, P < .001), and adrenaline (37 [21 - 53]%, P < .001), whereas no significant differences were observed at any dose of milrinone (5 [-12 to 22]%) and dobutamine (4 [-13 to 21]%). Lung tissue damping (G) was lower in animals receiving the highest doses of adrenaline (difference: 22 [7 - 37]%, P = .015), dobutamine (20 [5 - 35]%, P = .024), milrinone (20 [6 - 34]%, P = .026), and levosimendan (36 [19 - 53]%, P < .001) than in controls.
CONCLUSIONS: Although dobutamine and milrinone did not reduce cholinergic bronchoconstriction, they reversed the ACh-induced elevations in lung tissue resistance. In contrast, adrenaline, dopamine, and levosimendan exhibited both potent bronchodilatory action against ACh and diminished lung tissue damping. Further work is needed to determine whether these effects are clinically relevant in humans.

俯臥脊柱手術和急性腎損傷時血管加壓劑輸注：回顧性佇列分析

Vasopressor Infusion During Prone Spine Surgery and Acute Renal Injury: A Retrospective Cohort Analysis

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Anesthesia & Analgesia: 2019 129 896-904

背景：低血壓與急性腎損傷有關，但用於治療低血壓的血管加壓藥也可能損害腎功能。因此，我們驗證了複雜脊柱手術期間輸注升壓藥物與腎功能受損無關的假設。

方法：在這項回顧性佇列分析中，我們考慮了 2005 年 1 月至 2014 年 9 月在克利夫蘭診所主校區進行複雜脊柱手術的成年人。我們的主要結果是術後估計的腎小球濾過率。其次，我們使用急性腎損傷網路標準評估腎功能。我們獲得了 1814 例手術的資料，包括 689 例患者（38％），術中輸注升壓藥物≥30 分鐘，1125 例患者（62％）未進行。540 名未輸注加壓素的患者和 540 名患者在 32 個潛在

的混雜變數中進行了很好的匹配。

結果：在匹配的患者中，升壓藥輸注持續平均 173±100 分鐘（SD），並給予 3.4mg（1.5,6.7mg）去氧腎上腺素當量的中位劑量（第 1 個五分位，第 3 個五分位數）。每個匹配組的平均動脈壓和低血壓量相似。有和沒有升壓藥輸注的患者的平均估計腎小球濾過率的術後差異僅為 0.8 mL / min / 1.73 m 2（95％CI，-0.6 至 2.2 mL / min / 1.73 m 2）（P = .28）。術中輸注升壓藥也與增加的急性腎損傷階段的幾率增加無關。

結論：由於害怕促進腎臟損傷，臨床醫生不應該避免典型的圍手術期升壓藥劑量。容忍低血壓以避免使用升壓藥物可能是一種不好的策略。

魏婉婷譯 潘豔、薛張綱校）

BACKGROUND: Hypotension is associated with acute kidney injury, but vasopressors used to treat hypotension may also compromise renal function. We therefore tested the hypothesis that vasopressor infusion during complex spine surgery is not associated with impaired renal function.
METHODS: In this retrospective cohort analysis, we considered adults who had complex spine surgery between January 2005 and September 2014 at the Cleveland Clinic Main Campus. Our primary outcome was postoperative estimated glomerular filtration rate. Secondarily, we evaluated renal function using Acute Kidney Injury Network criteria. We obtained data for 1814 surgeries, including 689 patients (38%) who were given intraoperative vasopressors infusion for ≥30 minutes and 1125 patients (62%) who were not. Five hundred forty patients with and 540 patients without vasopressor infusions were well matched across 32 potential confounding variables.
RESULTS: In matched patients, vasopressor infusions lasted an average of 173 ± 100 minutes (SD) and were given a median dose (1st quintile, 3rd quintile) of 3.4-mg (1.5, 6.7 mg) phenylephrine equivalents. Mean arterial pressure and the amounts of hypotension were similar in each matched group. The postoperative difference in mean estimated glomerular filtration rate in patients with and without vasopressor infusions was only 0.8 mL/min/1.73 m ^{2} (95% CI, −0.6 to 2.2 mL/min/1.73 m ^{2}) (P =.28). Intraoperative vasopressor infusion was also not associated with increased odds of augmented acute kidney injury stage.

CONCLUSIONS: Clinicians should not avoid typical perioperative doses of vasopressors for fear of promoting kidney injury. Tolerating hypotension to avoid vasopressor use would probably be a poor strategy.

排除問題：術前使用大麻素對圍術期疼痛的影響

Weeding Out the Problem: The Impact of Preoperative Cannabinoid Use on Pain in the Perioperative Period

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Anesthesia & Analgesia: 2019 129 874-881

背景：大麻素的娛樂及醫療使用日益增加。然而多數研究著重於大麻素在急性疼痛管理中的作用，尚未有研究探討術前使用大麻素對手術患者術後結局的影響。這項回顧性佇列研究探討了在行大型骨科手術患者中，術前使用大麻素對術後疼痛評分及疼痛相關結局的影響。

方法：本研究回顧了 2015 年 5 月 1 日至 2017 年 6 月 30 日，與我院行大型骨科手術患者的結局。資料來自於急性疼痛資訊線上處理網（Networked Online Processing of Acute Pain Information），這是一個本地開發的資料庫用於我們的急性疼痛服務。本研究使用傾向得分匹配方法來平衡使用大麻素與未使用大麻素的兩組間的基線變數，包括年齡、性別、手術類型、既往抑鬱焦慮史、圍術期區域麻醉使用情況。術後早期（定義為術後 36 小時內）活動時疼痛強度為本研究的主要結局。次要結局（都是在術後早期）包括靜息狀態下疼痛情況、阿片類藥物使用情況、皮疹發生率、噁心嘔吐、鎮靜、譫妄、便秘、睡眠及軀體活動影響、患者對於鎮痛的滿意度，及急性疼痛服務的隨訪時長。

結果：本研究共納入 3793 位患者。其中 155 患者術前出於娛樂或是醫學指征使用了大麻素。在傾向性得分匹配後，我們比較了 155 位使用了大麻素的患者和

155 位未使用大麻素患者的資料。發現術前使用大麻素的患者疼痛數值評分更高（中位數 [25 百分位，75 百分位]），靜息時(5.0 [3.0, 6.1] vs 3.0 [2.0, 5.5], P =.010) ，活動時 (8.0 [6.0, 9.0] vs 7.0 [3.5, 8.5], P =.003), 有更高的靜息時中重度疼痛發生率(分別為 62.3% vs 45.5%, P = 0.004; 比值比, 1.98; 95% CI, 1.25 - 3.14)及活動時中重度疼痛發生率（分別為 85.7% vs 75.2% respectively, P = 0.021; 比值比, 1.98; 95% CI, 1.10 - 3.57）。術後早期，術前使用大麻素的患者較之未使用的患者睡眠中斷的發生率也更高。

結論：本傾向性配對的回顧性佇列研究顯示大麻素的使用與行大型骨科手術患者術後早期更高的疼痛評分及更差的睡眠品質相關。

（葉姍姍 譯 潘豔、薛張綱校）

BACKGROUND: The recreational and medical use of cannabinoids has been increasing. While most studies and reviews have focused on the role of cannabinoids in the management of acute pain, no study has examined the postoperative outcomes of surgical candidates who are on cannabinoids preoperatively. This retrospective cohort study examined the impact of preoperative cannabinoid use on postoperative pain scores and pain-related outcomes in patients undergoing major orthopedic surgery.
METHODS: Outcomes of patients who had major orthopedic surgery at our hospital between April 1, 2015 and June 30, 2017 were reviewed. Data were obtained from Networked Online Processing of Acute Pain Information, a locally developed database for our Acute Pain Service. Propensity score matching was used to balance baselines variables including age, sex, type of surgery, history of depression or anxiety, and perioperative use of regional anesthesia between patients who reported use of cannabinoids and those not on this substance. Intensity of pain with movement in the early postoperative period (defined as up to 36 hours after surgery) was the primary outcome of this study. The secondary outcomes (all in early postoperative period) were pain at rest, opioid consumption, incidence of pruritus, nausea and vomiting, sedation, delirium, constipation, impairment of sleep and physical activity, patient satisfaction with analgesia, and the length of Acute Pain Service follow-up.
RESULTS: A total of 3793 patients were included in the study. Of these, 155 patients were identified as being on cannabinoids for recreational or medical indications in the preoperative period. After propensity score

matching, we compared data from 155 patients who were on cannabinoids and 155 patients who were not on cannabinoids. Patients who were on preoperative cannabinoids had higher pain numerical rating score (median [25th, 75th percentiles]) at rest (5.0 [3.0, 6.1] vs 3.0 [2.0, 5.5], P = .010) and with movement (8.0 [6.0, 9.0] vs 7.0 [3.5, 8.5], P = .003), and a higher incidence of moderate-to-severe pain at rest (62.3% vs 45.5%, respectively, P = .004; odds ratio, 1.98; 95% CI, 1.25 - 3.14) and with movement (85.7% vs 75.2% respectively, P = .021; odds ratio, 1.98; 95% CI, 1.10 - 3.57) in the early postoperative period compared to patients who were not on cannabinoids. There was also a higher incidence of sleep interruption in the early postoperative period for patients who used cannabinoids.
CONCLUSIONS: This retrospective study with propensity-matched cohorts showed that cannabinoid use was associated with higher pain scores and a poorer quality of sleep in the early postoperative period in patients undergoing major orthopedic surgery.

持續的痛覺促進小鼠條件性位置偏愛模型中嗎啡誘導作用的消失

Persistent Nociception Facilitates the Extinction of Morphine-Induced Conditioned Place Preference

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Anesthesia & Analgesia: 2019 129 890-895

背景：隨著阿片類藥物濫用和成癮已經發展成為一場重大的國家健康危機，用於疼痛管理的阿片類藥物的處方變得更具爭議性。然而，阿片類藥物能通過緩解疼痛和改善生活品質來幫助一些患者。為了更好地瞭解阿片類藥物在慢性疼痛條件下的成癮性質，我們使用條件性位置偏愛（CPP）範例來檢查持續性傷害感受的大鼠中嗎啡的有益特性。

方法：用神經損傷（SNI）模型用於誘導大鼠持續性傷害感受。通過 von Frey 測試評估傷害感受行為。 使用 CPP 測試檢查嗎啡的有益特性。

結果：我們的研究結果如下：(1) SNI 大鼠與假手術大鼠注射後第 1 天嗎啡誘導 CPP 量值的差異無顯注差異(雙向方差分析; SNI 與假手術，F [1， 42] = 0.014，

P = .91;平均值差異的95%置信區間，-5.9 [-58 至 46]，0.76 [-51 至 53]和0.90 [-51 至 53]對於 2.5,5，分別為 10 毫克/千克）;（2）增加嗎啡劑量（2.5,5和 10 mg / kg）不會進一步增加假手術和 SNI 大鼠的 CPP 大小（劑量：F [2,42] = 0.94，P = .40）;（3）嗎啡誘導的 CPP 持續存在於假手術大鼠中，但在最後一次嗎啡注射後 8 天測試時在 SNI 大鼠中滅絕。(SNI 大鼠與假手術大鼠的實驗：Bonferroni 校正,5 和 10 毫克/千克劑量均為 p<0.06;方法差的置信區間為 95%，5 和 10 毫克/千克分別為 80.3[19.7-141]和 87.0[26.3-148])。

結論：我們的資料提供了新的證據支援大腦的效應電路在持續疼痛的情況下發生變化的觀點。這項觀察性研究表明，未來對存在阿片類藥物影響的神經生物學的研究需要考慮阿片類鎮痛藥的使用情況。

（應美晶譯 潘豔、薛張綱校）

BACKGROUND: As opioid abuse and addiction have developed into a major national health crisis, prescription of opioids for pain management has become more controversial. However, opioids do help some patients by providing pain relief and improving the quality of life. To better understand the addictive properties of opioids under chronic pain conditions, we used a conditioned place preference (CPP) paradigm to examine the rewarding properties of morphine in rats with persistent nociception.
METHODS: Spared nerve injury (SNI) model was used to induce persistent nociception in rats. Nociceptive behavior was assessed by von Frey test. CPP test was used to examine the rewarding properties of morphine.
RESULTS: Our findings are as follows: (1) SNI rats did not show a difference compared with sham rats in magnitude of morphine-induced CPP 1 day after last morphine injection (2-way analysis of variance; for SNI versus sham, $F[1,42] = 0.014$, $P = .91$; and 95% confidence intervals for difference of means, -5.9 [-58 to 46], 0.76 [-51 to 53], and 0.90 [-51 to 53] for 2.5, 5, and 10 mg/kg, respectively); (2) increasing morphine dosage (2.5, 5, and 10 mg/kg) did not further increase the magnitude of CPP in both sham and SNI rats (for dosage: $F[2,42] = 0.94$, $P = .40$); and (3) morphine-induced CPP persisted in sham rats but extinguished in SNI rats when tested at 8 days after last morphine injection (for sham versus SNI: Bonferroni correction, $P < .006$ for both 5 and 10 mg/kg

doses; and 95% confidence intervals for difference of means, 80.3 [19.7 - 141] and 87.0 [26.3 - 148] for 5 and 10 mg/kg, respectively).
CONCLUSIONS: Our data provide new evidence supporting the notion that the brain's reward circuitry changes in the context of persistent pain. This observational study suggests that future investigation into the neurobiology of opioid reward requires consideration of the circumstances in which opioid analgesics are administered.

超聲心動圖舒張功能不全 III 級與手術後主要不良心血管事件風險增加相關：一項回顧性佇列研究

Grade 3 Echocardiographic Diastolic Dysfunction Is Associated With Increased Risk of Major Adverse Cardiovascular Events After Surgery: A Retrospective Cohort Study

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Anesthesia & Analgesia: 2019 129p 651-658

背景：心室舒張功能不全常見且可能會增加心血管併發症的風險。本研究調查如下假設：在孤立性左心室舒張功能障礙的患者中，較高等級的舒張功能不全與手術後主要不良心血管事件（MACE）的風險增加有關。

方法：這是一項回顧性佇列研究。 收集 2015 年 1 月 1 日至 2015 年 12 月 31 日接受非心臟手術的孤立性超聲心動圖顯示的舒張功能不全（射血分數≥50％）的成年患者資料。 主要終點是住院期間術後 MACE 的發生，包括急性心肌梗死，充血性心力衰竭，卒中，非致死性心臟驟停和心源性死亡。 使用多變數邏輯模型評估舒張功能不全等級與 MACE 發生之間的關聯。

結果：最終分析共納入 2976 名患者。 其中，297 例（10.0％）手術後發生 MACE。矯正混雜因素後，與舒張功能不全 I 級和 II 級相比，III 級與更高的術後 MACE 風險相關（比值比，1.71; 95％置信區間，1.28-2.27; P <.001）。與舒張功能不全 I 級和 II 級相比，III 級存在更多的非 MACE 併發症（未校正比值比，1.44; 95％置

信區間，1.07-1.95; P = .017）。

結論：接受非心臟手術的孤立性舒張功能不全患者中，10.0%術後住院期間發生MACE; 舒張功能不全 III 級與 MACE 風險增加有關。

蔣旭亮 譯　陳傑 校

Background: Diastolic dysfunction is common and may increase the risk of cardiovascular complications. This study investigated the hypothesis that, in patients with isolated left ventricular diastolic dysfunction, higher grade diastolic dysfunction was associated with greater risk of major adverse cardiovascular events (MACEs) after surgery.
Methods: This was a retrospective cohort study. Data of adult patients with isolated echocardiographic diastolic dysfunction (ejection fraction, ≥50%) who underwent noncardiac surgery from January 1, 2015 to December 31, 2015 were collected. The primary end point was the occurrence of postoperative MACEs during hospital stay, which included acute myocardial infarction, congestive heart failure, stroke, nonfatal cardiac arrest, and cardiac death. The association between the grade of diastolic dysfunction and the occurrence of MACEs was assessed with a multivariable logistic model.
Results: A total of 2976 patients were included in the final analysis. Of these, 297 (10.0%) developed MACEs after surgery. After correction for confounding factors, grade 3 diastolic dysfunction was associated with higher risk of postoperative MACEs (odds ratio, 1.71; 95% confidence interval, 1.28-2.27; P < .001) when compared with grades 1 and 2. Patients with grade 3 diastolic dysfunction developed more non-MACE complications when compared with grades 1 and 2 (uncorrected odds ratio, 1.44; 95% confidence interval, 1.07-1.95; P = .017).
Conclusions: In patients with isolated diastolic dysfunction undergoing noncardiac surgery, 10.0% develop MACEs during hospital stay after surgery; grade 3 diastolic dysfunction is associated with greater risk of MACEs.

機械通氣或血管加壓素支持和/或死亡可作為圍術期監護研究的推薦綜合預後指標。

Invasive Respiratory or Vasopressor Support and/or Death as a Proposed Composite Outcome Measure for Perioperative Care Research

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Anesthesia & Analgesia: 2019 129 679-685

背景：如今需要臨床相關且可行的預後指標以便於圍術期監護學的臨床研究。這

項大規模的回顧性佇列研究提出了一種新的綜合預後測量指標，包括機械通氣或血管加壓素支持（IRVS）和死亡。作者描述接受大型腹部手術的患者中 IRVS 的發生率，並評估了將 IRVS 與死亡相結合以形成複合預後指標的有效性。

方法：作者回顧性收集了在京都大學醫院接受大型腹部手術（肝臟，結腸直腸，胃，胰腺或食管切除術）的 2776 名患者的圍術期數據。將 IRVS 定義為術後≥24 小時接受機械通氣，術後再次插管或術後給予血管加壓素治療。在術後 30 天內評估 IRVS 的發生率，並調查 IRVS 與隨後臨床預後之間的關聯。關注的主要預後指標是長期生存率。進行多變數 Cox 比例回歸分析以校正基線患者和手術特徵。次要預後指標是住院時間和住院死亡率。

結果：總共有 85 例患者（3.1％）在術後 30 天內接受了 IRVS，其中 15 例在 30 天內死亡.相比非 IRVS 患者，IRVS 患者的長期生存率更低（1 年和 3 年生存率，66.1％和 48.5％）分別為 95.2％和 84.0％; P <0.001，對數秩檢驗。在校正基線患者和手術特徵後，IRVS 與較低的長期生存率顯著相關（校正風險比，2.72; 95％置信區間，1.97-3.77; P <0.001）。 IRVS 組有更長的住院時間（中位數[四分位數]，65 [39-326]對 15 [12-24]天;校正後 P <0.001）和更高的住院死亡率（24.7％對 0.5％;校正後的 P <0.001）。此外，當分析僅限於 30 天倖存者時，IRVS 與隨後的臨床預後負相關，包括較低的長期生存率（校正風險比，1.78; 95％置信區間，1.21-2.63; P = 0.004）。

結論：IRVS 患者即使在術後第 30 天存活，也可能經歷嚴重併發症發生和長期生存率較低的風險。本研究結果支持使用 IRVS 和/或死亡作為圍術期監護學臨床研究的綜合預後指標的有效性。

（蔣旭亮 譯　陳傑 校）

Background: There is a need for a clinically relevant and feasible outcome measure to facilitate clinical studies in perioperative care medicine. This large-scale retrospective cohort study proposed a novel composite outcome measure comprising invasive respiratory or vasopressor support (IRVS) and death. We described the prevalence of IRVS in patients undergoing major abdominal surgery and assessed the validity of combining IRVS and death to form a composite outcome measure.
Methods: We retrospectively collected perioperative data for 2776 patients undergoing major abdominal surgery (liver, colorectal, gastric, pancreatic, or esophageal resection) at Kyoto University Hospital. We defined IRVS as requirement for mechanical ventilation for ≥24 hours postoperatively, postoperative reintubation, or postoperative vasopressor administration. We evaluated the prevalence of IRVS within 30 postoperative days and examined the association between IRVS and subsequent clinical outcomes. The primary outcome of interest was long-term survival. Multivariable Cox proportional regression analysis was performed to adjust for the baseline patient and operative characteristics. The secondary outcomes were length of hospital stay and hospital mortality.
Results: In total, 85 patients (3.1%) received IRVS within 30 postoperative days, 15 of whom died by day 30. Patients with IRVS had a lower long-term survival rate (1- and 3-year survival probabilities, 66.1% and 48.5% vs 95.2% and 84.0%, respectively; P < .001, log-rank test) compared to those without IRVS. IRVS was significantly associated with lower long-term survival after adjustment for the baseline patient and operative characteristics (adjusted hazard ratio, 2.72; 95% confidence interval, 1.97-3.77; P < .001). IRVS was associated with a longer hospital stay (median [interquartile range], 65 [39-326] vs 15 [12-24] days; adjusted P < .001) and a higher hospital mortality (24.7% vs 0.5%; adjusted P < .001). Moreover, IRVS was adversely associated with subsequent clinical outcomes including lower long-term survival (adjusted hazard ratio, 1.78; 95% confidence interval, 1.21-2.63; P = .004) when the analyses were restricted to 30-day survivors.
Conclusions: Patients with IRVS can experience ongoing risk of serious morbidity and less long-term survival even if alive at postoperative day 30. Our findings support the validity of using IRVS and/or death as a composite outcome measure for clinical studies in perioperative care medicine.**通過混合輸注辣椒素和河豚毒素載入的脂質體延長局部麻醉持續時間。**

Prolonged Duration Local Anesthesia by Combined Delivery of Capsaicin- and Tetrodotoxin-Loaded Liposomes

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Anesthesia & Analgesia: 2019 129 709-717

背景：辣椒的活性成分辣椒素可產生選擇性外周感覺神經阻滯。共同給予辣椒素

和河豚毒素（位點 1 鈉通道阻滯劑）可以對神經阻滯的持續時間產生協同效應。然而，辣椒素可能具有神經毒性，河豚毒素可引起全身毒性。作者評估混合輸注辣椒素和河豚毒素載藥脂質體是否可以實現延長局部麻醉而無局部或全身毒性反應。

方法：辣椒素和河豚毒素載藥脂質體已實現。在雄性 Sprague-Dawley 大鼠坐骨神經處注射游離辣椒素，辣椒素載藥脂質體，游離河豚毒素，河豚毒素載藥脂質體和空白脂質體，單獨或混合使用。分別通過改良的熱板試驗和負重試驗評估感覺和運動神經阻滯。通過注射部位組織的組織學評分和坐骨神經的透射電子顯微鏡檢查評估局部毒性。通過對側神經缺陷和/或死亡率評估全身毒性。

結果：辣椒素載藥脂質體和河豚毒素載藥脂質體的混合注射實現了平均感覺阻滯持續時間為 18.2 小時（3.8 小時）[平均值（SD）]，遠遠長於辣椒素載藥脂質體[0.4 小時（0.5 小時）]（P <0.001）或者河豚毒素載藥脂質體[0.4 小時（0.7 小時）]（P <0.001）的單獨注射，在游離溶液中分別給予或不給予第二種藥物。這種組合帶來最小的肌肉毒性和肌肉炎症，並且無髓鞘軸突的百分比或直徑沒有變化。因此無全身毒性。

結論：包載河豚毒素和辣椒素的組合注射顯著延長神經阻滯的時間。該組合不會引起可檢測的局部或全身毒性。即使使用非常小的安全劑量，由於存在在其他配方的協同效應，辣椒素也具實用性。

（蔣旭亮 譯　陳傑 校）

Background: Capsaicin, the active component of chili peppers, can produce sensory-selective peripheral nerve blockade. Coadministration of capsaicin and tetrodotoxin, a site-1 sodium channel blocker, can achieve a synergistic effect on duration of nerve blocks. However, capsaicin can be neurotoxic, and tetrodotoxin can cause systemic toxicity. We evaluated whether codelivery of capsaicin and tetrodotoxin liposomes can achieve prolonged local anesthesia without local or

systemic toxicity.
Methods: Capsaicin- and tetrodotoxin-loaded liposomes were developed. Male Sprague-Dawley rats were injected at the sciatic nerve with free capsaicin, capsaicin liposomes, free tetrodotoxin, tetrodotoxin liposomes, and blank liposomes, singly or in combination. Sensory and motor nerve blocks were assessed by a modified hotplate test and a weight-bearing test, respectively. Local toxicity was assessed by histologic scoring of tissues at the injection sites and transmission electron microscopic examination of the sciatic nerves. Systemic toxicity was assessed by rates of contralateral nerve deficits and/or mortality.
Results: The combination of capsaicin liposomes and tetrodotoxin liposomes achieved a mean duration of sensory block of 18.2 hours (3.8 hours) [mean (SD)], far longer than that from capsaicin liposomes [0.4 hours (0.5 hours)] ($P < .001$) or tetrodotoxin liposomes [0.4 hours (0.7 hours)] ($P < .001$) given separately with or without the second drug in free solution. This combination caused minimal myotoxicity and muscle inflammation, and there were no changes in the percentage or diameter of unmyelinated axons. There was no systemic toxicity.
Conclusions: The combination of encapsulated tetrodotoxin and capsaicin achieved marked prolongation of nerve block. This combination did not cause detectable local or systemic toxicity. Capsaicin may be useful for its synergistic effects on other formulations even when used in very small, safe quantities.

通過使用 **Belmont** 加溫快速輸注系統 進行輸血與術中嚴重低血壓發生的相關性研究

Profound Intraoperative Hypotension Associated With Transfusion via the Belmont Fluid Management System
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Anesthesia & Analgesia: 2019 129 77-82

這項在 2 個大型教學醫院，為期 4 年的回顧性觀察研究收集了 15 例術中在使用 **Belmont加溫快速輸注系統**進行血製品快速輸注後即刻出現嚴重低血壓的病例。停止輸血和給予血管活性劑後低血壓現象消失。除非使用血管活性藥物，否則再次使用**加溫快速輸注系統**進行輸血會導致低血壓的重複出現。目前病因未明。該研究是一項調查急性低血壓輸血反應與應用于外科患者的任一快速輸注系統樣本量最大的相關性研究。

（吳彤 譯　陳傑 校）

This retrospective observational case series conducted at 2 large academic centers over a 4-year period consists of 15 cases of profound hypotension in surgical patients immediately after initiation of the Belmont Fluid Management System for rapid transfusion of blood products. Halting the infusion and administering vasoactive agents led to resolution of hypotension. Repeat transfusion with the Belmont system resulted in repeat hypotension unless counteracted with vasopressors. No etiology was elucidated. This represents the largest documented association of acute hypotensive transfusion reaction with any rapid infusion system in surgical patients.

入住重症監護病房對術後住院時間和費用的影響：一項預設定的傾向性匹配佇列研究

The Impact of Postoperative Intensive Care Unit Admission on Postoperative Hospital Length of Stay and Costs: A Prespecified Propensity-Matched Cohort Study

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Anesthesia & Analgesia: 2019 129 753-761

背景：在這項預設定的佇列研究中，作者調查了接受中度風險手術的患者術後入住重症監護室或外科病房對醫療資源利用的影響。

方法：針對沒有絕對術後入住 ICU 的全麻手術成年患者，基於 23 項重要的術前和術中的傾向評分預測變數，作者將 3530 例術後入住 ICU 的患者與 3530 例術後入普通病房的患者進行匹配。術後住院時間和住院費用分別定義為主要和次要終點。

結果：在術後 ICU 入住傾向評分較低的患者中，選擇術後入住 ICU 與術後住院時間的延長（發病率為 1.69 [95％CI，1.59-1.79]; P <0.001）以及住院費用的增加（發病率，1.92 [95％CI，1.81-2.03]; P <0.001）相關。相反，高傾向評分患者術

後入住 ICU 與術後住院時間縮短（發生率，0.90 [95%CI，0.85-0.95]; P <0.001）和降低住院費用（發病率，0.92 [95% CI, 0.88–0.97]; P = 0.001）相關。關於術後 ICU 資源使用的決定受到麻醉和外科醫生個人偏好的影響。

結論：對於進入重症監護室指征不明確的患者，術後入住重症監護病房可能會延長術後住院時間且增加醫療費用。術後病人的安置去向會因為麻醉和手術醫生個人偏好而產生很大差異，但最優的評估方式是通過對手術結束時患者的狀態進行客觀評估。

（吳彤 譯　陳傑 校）

Background: In this prespecified cohort study, we investigated the influence of postopera- tive admission to the intensive care unit versus surgical ward on health care utilization among patients undergoing intermediate-risk surgery.
Methods: Of adult surgical patients who underwent general anesthesia without an absolute indication for postoperative intensive care unit admission, 3530 patients admitted postoperatively to an intensive care unit were matched to 3530 patients admitted postoperatively to a surgical ward using a propensity score based on 23 important preoperative and intraoperative predictor variables. Postoperative hospital length of stay and hospital costs were defined as primary and secondary end points, respectively.
Results: Among patients with low propensity for postoperative intensive care unit admission, initial triage to an intensive care unit was associated with increased postoperative length of stay (incidence rate ratio, 1.69 [95% CI, 1.59–1.79]; P < .001) and hospital costs (incidence rate ratio, 1.92 [95% CI, 1.81–2.03]; P < .001). By contrast, postoperative intensive care unit admission of patients with high propensity was associated with decreased postoperative length of stay (incidence rate ratio, 0.90 [95% CI, 0.85–0.95]; P < .001) and costs (incidence rate ratio, 0.92 [95% CI, 0.88–0.97]; P = .001). Decisions regarding post- operative intensive care unit resource utilization were influenced by individual preferences of anesthesiologists and surgeons.
Conclusions: In patients with an unclear indication for postoperative critical care, intensive care unit admission may negatively impact postoperative hospital length of stay and costs. Postoperative discharge disposition varies substantially based on anesthesia and surgical provider preferences but should optimally be driven by an objective assessment of a patient’s status at the end of surgery.

加速外科康復方式下行婦科微創手術入院的預測因素

Predictors of Admission After the Implementation of an Enhanced Recovery After Surgery Pathway for Minimally Invasive Gynecologic Surgery

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Anesthesia & Analgesia: 2019 129 776-783

背景：在婦科手術中加速康復外科（ERAS）途徑已被證明在不影響再入院的情況下可減少住院時間，但尚未有研究對該人群的入院預測因素進行評估。本研究目的是確定在 ERAS 理念下進行腹腔鏡子宮切除術（LH）和機器人輔助子宮切除術（RAH）後入院的預測因素。

方法： 這是一項前瞻性觀察性研究，納入了在 ERAS 診療方式中具有接受 LH / RAH 治療適應症的女性。該研究所收集的資料包括當天出院/入院原因，緊急診所和急診室（ER）就診的發生率，再入院率，再次手術率以及下面列出的 9 個假定的入院預測因素。使用 Fisher exact 和 Student t 檢驗比較兩組（手術當天出院的 ERAS 患者與住院患者）患者人口統計學資料，基線健康指標和臨床結果。校正年齡、種族、體重指數、ASA 評分、提示子宮切除術的術前診斷、術前慢性疼痛、完成前期疼痛治療諮詢會議、手術時間以及對 ERAS 的依從情況後，多變數邏輯回歸用於評估住院的潛在風險因素。

結果： 在 ERAS 途徑中有 165 名患者接受 LH / RAH 治療; 93 例（56％）手術當天出院，72 例住院。ER 就診，再入院和再次手術組間沒有顯著差異（ER 就診率：出院組 13％，住院組 13％，P = 0.99; 90 天內再入院率：出院組 4％，住院組 7％，P = 0.51；和 90 天內再次手術率：出院組 4％，住院組 3％，P =0.70）。住院的最常見原因是術後尿瀦留（n = 21，30％），疼痛控制不佳（n = 21，30％），術後噁心和嘔吐（n = 7，10％）和計畫住院（n = 7，10％）。ASA 評分增加、非

洲裔美國人以及手術時間延長與住院風險增加顯著相關（AS III 級與 ASA I 或 II 級：優勢比[OR]，3.12; 95％置信區間[CI]，1.36-7.16; P = 0.007;非洲裔美國人：OR，2.47；95％CI，1.02-5.96；P =0.04；以及手術時間長度，以 30 分鐘為遞增量進行評估：OR，1.23;；95％CI ，1.02-1.50；P = 0.04）。

結論：該研究確定以 ERAS 方式行 LH / RAH 治療的患者住院預測因素。 ASA 評分增加、非洲裔美國人和手術時間的延長與 ERAS 方式下進行 LH / RAH 的住院顯著相關。此外，手術當天出院的緊急門診和急診室就診，再入院和再次手術的發生率與手術當天出院患者相似。

（吳彤 譯　陳傑 校）

Background: Enhanced recovery after surgery (ERAS) pathways in gynecologic surgery have been shown to decrease length of stay with no impact on readmission, but no study has assessed predictors of admission in this population. The purpose of this study was to identify predictors of admission after laparoscopic hysterectomy (LH) and robotic-assisted hysterectomy (RAH) performed under an ERAS pathway.

Methods: This is a prospective observational study of women undergoing LH/RAH for benign indications within an ERAS pathway. Data collected included same-day discharge, reason for admission, incidences of urgent clinic and emergency room (ER) visits, readmissions, reoperations, and 9 postulated predictors of admission listed below. Patient demographics, markers of baseline health, and clinical outcomes were compared between groups (ERAS patients discharged on the day of surgery versus admitted) using Fisher exact and Student t tests. Multivariable logistic regression was used to assess the potential risk factors for being admitted, adjusting for age, race, body mass index, American Society of Anesthesiologists (ASA) physical status score, preop- erative diagnosis indicative of hysterectomy, preoperative chronic pain, completion of a preprocedure pain-coping skills counseling session, procedure time, and compliance to the ERAS pathway.

Results: There were 165 patients undergoing LH/RAH within an ERAS pathway; 93 (56%) were discharged on the day of surgery and 72 were admitted. There were no significant differences in ER visits, readmissions, and reoperations between groups (ER visits: discharged 13% versus admitted 13%, P = .99; 90-day readmission: discharged 4% versus admitted 7%, P = .51; and 90-day reoperation: discharged 4% versus admitted 3%, P = .70). The most common reasons for admission were postoperative urinary retention (n = 21, 30%), inadequate pain control (n = 21, 30%), postoperative nausea and vomiting (n = 7, 10%), and planned admissions (n = 7, 10%). Increased ASA physical status, being African American, and increased length of

procedure were significantly associated with an increased risk of admission (ASA physical status III versus ASA physical status I or II: odds ratio [OR], 3.12; 95% confidence interval [CI], 1.36–7.16; P = .007; African American: OR, 2.47; 95% CI, 1.02–5.96; P = .04; and length of procedure, assessed in 30-minute increments: OR, 1.23; 95% CI, 1.02–1.50; P = .04).

Conclusions: We were able to define predictors of admission for patients having LH/RAH managed with an ERAS pathway. Increased ASA physical status, being African American, and increased length of procedure were significantly associated with admission after LH/RAH performed under an ERAS pathway. In addition, the incidences of urgent clinic and ER visits, readmissions, and reoperations within 90 days of surgery were similar for patients who were discharged on the day of surgery compared to those admitted.

一項隨機對照試驗：氣管導管熱軟化技術是否有助於視頻喉鏡引導下經鼻氣管插管？

Is Tube Thermosoftening Helpful for Videolaryngoscope-Guided Nasotracheal Intubation？A Randomized Controlled Trial.

Kim EM，Chung MH，Lee MH，Choi EM，Jun IJ，Yun TH，Ko YK，Kim JH，Jun JH.
Anesthesia & Analgesia: 2019 129 p812-p818

背景：氣管導管（ETT）熱軟化技術和使用矽橡膠氣管導管已經被建議用於經鼻氣管插管（NTI）以減少鼻衄。然而，已知使用熱軟化技術會造成 NTI 期間如不使用麥氏插管鉗將難以進行氣管插管。無論氣管導管硬度如何，在直接喉鏡引導時套囊充氣已經被建議作為一種替代氣管插管鉗進行引導的有效方法。作者評估矽橡膠導管的熱軟化是否在減少鼻部損傷方面具有額外的益處。同時還評價氣管導管熱軟化在套囊充氣協助的視頻喉鏡引導經鼻插管期間是否增加了其引導難度。

方法：根據是否加溫軟化氣管導管，將 140 名患者隨機分配到 2 組中。主要預後指標是 NTI 期間鼻衄的發生率。次要結果是氣管導管的引導性，通過引導等級和在各階段插入氣管導管所需的時間[從鼻到口咽，從口咽到聲門入口（如需要，

進行套囊充氣）以及從聲門入口到氣管]來評估。

結果：所有 140 名患者均成功進行經鼻氣管插管。與對照組相比，熱軟化組的鼻衄發生率和嚴重程度顯著更低（7％VS51％;差異率 44.2％; 95％置信區間，29.9％-56.2％; *P* <0.001），氣管導管通過鼻腔具有更低的阻力（*P* = 0.001）和更短的時間（*P* <0.001）。 兩組從口咽到聲門入口（兩組之間分別為 *P*>0.99 和 *P* =0.054）和從聲門入口到氣管導管插入（兩組之間分別為 *P*>0.99，*P*=0.750）的引導等級和所需時間的難易程度沒有差異。所有氣管導管都可以在不使用插管鉗的情況下引導到氣管中。

結論：由於顯著降低鼻衄發生率並且不會增加氣管導管進入口咽的引導難度，在視頻喉鏡引導的經鼻氣插管期間使用熱軟化的矽橡膠氣管導管並進行套囊充氣輔助具有益。

BACKGROUND：Thermosoftening of the endotracheal tube (ETT) and telescoping the ETT into a rubber catheter have been suggested as a method for reducing epistaxis during nasotracheal intubation (NTI). However, thermosoftening technique is known to make it difficult to navigate the ETT into trachea without the use of Magill forceps during NTI. The cuff inflation technique has been suggested as an effective alternative to the use of Magill forceps to improve the oropharyngeal navigation of the ETT, irrespective of their stiffness, during direct laryngoscope-guided NTI. We evaluated whether thermosoftening of the ETT telescoped into rubber catheters has an additional benefit in reducing nasal injury. Simultaneously, we also evaluated whether thermosoftening of the ETT worsened orotracheal navigability during cuff inflation-supplemented videolaryngoscope-guided NTI.

METHODS：One hundred forty patients were randomly assigned to 1 of the 2 groups depending on whether the ETT was softened by warming or not. The primary outcome was the incidence of epistaxis during NTI. The secondary outcome was nasotracheal navigability of the ETT, assessed by navigation grade and time required for insertion of ETT in each phase (from nose to oropharynx, from oropharynx to glottic inlet aided by cuff inflation if needed, and from glottic inlet to trachea).

RESULTS：The ETTs were successfully inserted through the selected nostril of all 140 patients. In the thermosoftening group, the incidence and severity of epistaxis was

significantly lower (7% vs 51%; difference of 44.2%; 95% confidence interval, 29.9%-56.2%; P < .001), and the ETT passed through the nasal cavity with lower resistance (P = .001) and less time (P < .001) when compared to the control group. No difference was found in the ease of ETT insertion (navigation grade and time required) from the oropharynx to the glottic inlet (P > .99 and P = .054, respectively) and from the glottic inlet to the trachea (P > .99 and P = .750, respectively) between the 2 groups. In both groups, all ETTs could be navigated into the trachea without the use of Magill forceps.

CONCLUSIONS：Supplemented with cuff inflation during videolaryngoscope-guided NTI, thermosoftening of the ETT telescoped into rubber catheters has a substantial benefit because it significantly reduces the incidence of epistaxis without worsening the oropharyngeal navigability of the ETT.

一項初步研究：老年患者的神經認知障礙與結腸鏡檢查的關係

Pilot Study: Neurocognitive Disorders and Colonoscopy in Older Adults.

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Anesthesia & Analgesia: 2019 129 e89-p e93

摘要：在對 64 歲以上患者進行包含綜合神經心理學檢查的術前麻醉準備時，作者完成了一項關於神經認知障礙與遺漏結腸鏡檢查頻率和腸道準備品質之間關係的初步研究。胃腸病醫生為獲得每位患者的波士頓腸道準備量表（BBPS）資訊。 在 47 名老年患者中，68％符合神經認知障礙標準。所有未參加結腸鏡檢查的患者都符合重度神經認知障礙標準。不充分的胃腸道準備與 100%的重度神經認知障礙和 28%的中度神經認知障礙有關。此試驗資料表明，在高危人群中，神經認知障礙是錯過預約和腸道準備不足的風險因素。這些試驗資料可為未來的干預方法提供參考依據。

In a preoperative anesthesia setting with integrated neuropsychology for individuals >64 years of age, we completed a pilot study examining the association between neurocognitive disorders with frequency of missed colonoscopies and quality of bowel preparation (prep). Gastroenterologists completed the Boston Bowel Preparation Scale (BBPS) for each patient. Of 47 older adults seen in our service, 68% met criteria for neurocognitive disorders. All individuals failing to attend the colonoscopy procedure had met criteria for major neurocognitive disorder. Poor

bowel prep was also identified in 100% of individuals with major neurocognitive disorder and 28% of individuals with mild neurocognitive disorder. Our pilot data suggest that, in high-risk individuals, the presence of neurocognitive disorders is risk factors for missed appointments and inadequate bowel prep. These pilot data provide reference statistics for future intervention protocols.

副交感神經張力活性評價判斷豬的酮咯酸和酮咯酸/曲馬多鎮痛水準

Parasympathetic Tone Activity Evaluation to Discriminate Ketorolac and Ketorolac/TramadolAnalgesia Level in Swine.

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Anesthesia & Analgesia: 2019 129 - p882-p889.

背景：根據臨床標準進行全身麻醉過程中疼痛，鎮痛平衡的評估仍然具有挑戰性。可以使用副交感神經張力活動（PTA）監測器優化使用的鎮痛藥物。本研究使用 PTA 監測儀比較酮咯酸和酮咯酸/曲馬多平衡鎮痛。

方法：在平穩的七氟醚麻醉下，對豬進行傷害性刺激後使用 0-100 數位狀態量表（PTA）評估疼痛強度反應。我們還測量了 BIS，心率，無創血壓和呼吸參數。將動物分成 3 組：無鎮痛組，酮咯酸組和酮咯酸/曲馬多組。使用方差分析和非參數 Kruskal-Wallis 檢驗的混合模型進行重複測量分析，然後進行 Bonferroni 或 Dunn 多重比較，比較選定時間段內的平均值或曲線下的平均面積（AUC）。

結果：在沒有鎮痛且僅用酮咯酸治療的動物中施用刺激物後，觀察到 PTA，AUC 平均值顯著降低。對照組的 PTA，AUC 平均值顯著低於酮咯酸組中的相應平均值。酮咯酸/曲馬多組顯示出最高的 PTA，AUC 平均值，與其他 2 組比較有顯著差異，並且在不同時間點沒有檢測到顯著差異。BIS 在不同時間點或不同治療組之間沒有顯著的統計學意義。在進行刺激後，無鎮痛和酮咯酸/曲馬多組間的心率 AUC 平均值顯著增加。無創血壓在各時間點和治療組之間沒有顯示出統計學差異。

結論：該研究表明，酮咯酸和曲馬多的低劑量組合足以在給藥後 20 分鐘阻斷使用持針器對豬的刺激因引起的疼痛反應。PTA 監測儀能夠清楚地識別治療之間的鎮痛水準，並可用於優化給藥。

BACKGROUND：Evaluation of nociceptive-antinociceptive balance during general anesthesia is still challenging and routinely based on clinical criteria. Analgesic drug delivered may be optimized with parasympathetic tone activity (PTA) monitor. This study compares ketorolac and ketorolac/tramadol balance analgesia using a PTA monitor.

METHODS：Pain intensity response was assessed using a 0-100 numerical state scale (PTA) after nociceptive stimuli in pigs under stable sevoflurane anesthesia. Bispectral index, heart rate, noninvasive blood pressure, and respiratory parameters were also measured. Animals were divided into 3 groups: without analgesia, ketorolac, and ketorolac/tramadol. Mean values or mean areas under the curve (AUC) in selected time periods were compared over time and between groups through a mixed-model repeated measures analysis of variance and nonparametric Kruskal-Wallis tests, followed by Bonferroni or Dunn's multiple comparisons.

RESULTS：It was observed a significant decrease in the PTA AUC mean value after application of the stimulus in animals treated without analgesia and only with ketorolac. The PTA AUC mean value in the control group was significantly lower than the corresponding mean in ketorolac group. The ketorolac/tramadol group showed the highest PTA AUC mean values, significantly different from those obtained for the other 2 groups, with no significant differences detected over time. Bispectral index means showed no statistically significant differences either over time periods or between different treatment groups. Heart rate showed only a statistically significant increase in AUC mean between without analgesia and ketorolac/tramadol group, in the time period after the stimulus application. Noninvasive blood pressure means showed no statistically significant differences over time and between treatment groups.

CONCLUSIONS: This study shows that a low dose combination of ketorolac and tramadol is sufficient to block the pain responses induced with a needle holder in pigs 20 minutes after its administration. The PTA monitor was able to clearly recognize the analgesic level between treatments and may be used to optimize analgesic drug delivered.

外科病人圍手術期通過短信戒煙方案的可行性

Feasibility of a Perioperative Text Messaging Smoking Cessation Program

for Surgical Patients

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Anesthesia & Analgesia: 2019 129 e73-e76

儘管吸煙的外科病人可以從圍手術期戒煙中獲益，但目前很少有人能夠做到。該項初步研究確定了圍手術期通過短信戒煙計畫的可行性和可接受性。100 名患者（73%的符合條件的患者有吸煙史）註冊了一項特定於手術的資訊服務，30 天內每天收到 1-3 條關於吸煙和手術康復的資訊。只有 17 名患者沒有註冊，大多數病人對提示資訊作出回應，對該專案的滿意度很高。外科病人對於短資訊干預具有依從性；在外科病人中，有必要對短資訊戒煙支援的預期療效進行進一步的試驗。

（吳潔譯 李士通校）

Although surgical patients who smoke could benefit from perioperative abstinence, few currently receive support. This pilot study determined the feasibility and acceptability of a perioperative textmessaging smoking cessation program. One hundred patients (73% of eligible patients approached) enrolled in a surgery-specific messaging service, receiving 1-3 daily messages about smoking and surgical recovery for 30 days. Only 17 patients unenrolled, the majority responded to prompting messages, and satisfaction with the program was high. Surgical patients are amenable to text message-based interventions; a future efficacy trial of text messaging smoking cessationsupport in surgical patients is warranted.

鎂對預防外科手術病人寒戰的作用：系統回顧與薈萃分析

Effectiveness of Magnesium in Preventing Shivering in Surgical Patients: A Systematic Review and Meta-analysis

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Anesthesia & Analgesia: 2019 129 689-700

背景：鎂圍手術期抗寒戰作用的臨床試驗結果不一致。我們對圍手術期使用鎂劑

預防寒戰的效果進行了系統回顧和薈萃分析，並進行了試驗序列分析。

方法：我們搜索了 PubMed、EMBASE、科學網、Cochrane 臨床對照試驗中心註冊庫和 2 個註冊網站，以獲得隨機臨床試驗，這些試驗比較了患者術中使用鎂劑與安慰劑或不接受任何治療的情況。薈萃分析的主要結果是寒戰的發生率。採用隨機效應模型，將寒戰發生率與 95%可信區間合併為風險比。在亞組分析中評估給藥途徑的效果，並進行 1 型錯誤風險為 5%和檢驗力 90%的試驗序列分析。對每項試驗的品質進行評估，並使用證據推薦分級的評估、制定與評價系統對證據品質進行評估。我們還評估了不良事件。

結果：一共納入 64 個試驗和 4303 名患者（分別是鎂組 2300 名和對照組 2003 名患者）。鎂組和對照組的總寒戰發生率分別為 9.9%和 23.0%（風險比為 0.42；95%可信區間為 0.33-0.52）。亞組分析顯示，靜脈注射（風險比為 0.29；95%可信區間為 0.29-0.54；推薦性評估、制定與評價分級為中度）、硬膜外注射（風險比為 0.24；95%可信區間為 0.13-0.43；推薦性評估、制定與評價分級為低級）和鞘內注射（風險比為 0.64；95%可信區間為 0.43-0.96；推薦性評估、制定與評價分級為中等）的寒戰發生率較低。只有低偏倚風險的試驗被納入試驗序列分析中。儘管只有 34.9%的目標樣本量，但靜脈給予鎂劑的 z 累積曲線通過了試驗序列分析監測邊界以獲得效益。硬膜外或鞘內給藥的 z-累積曲線沒有通過試驗序列分析監測邊界。不良事件沒有增加。

結論：圍手術期靜脈注射鎂能有效地減少寒戰，試驗序列分析表明，無需再進行試驗來證實靜脈注射鎂能有效地減少寒戰。

（吳潔譯 李士通校）

BACKGROUND: Clinical trials regarding the antishivering effect of perioperative magnesium have produced inconsistent results. We

conducted a systematic review and meta-analysis with Trial Sequential Analysis to evaluate the effect of perioperative magnesium on prevention of shivering.

METHODS: We searched PubMed, EMBASE, Web of Science, Cochrane Central Register of Controlled Trials, and 2 registry sites for randomized clinical trials that compared the administration of magnesium to a placebo or no treatment in patients undergoing surgeries. The primary outcome of this meta-analysis was the incidence of shivering. The incidence of shiveringwas combined as a risk ratio with 95% CI using a random-effect model. The effect of the route of administration was evaluated in a subgroup analysis, and Trial Sequential Analysis with a risk of type 1 error of 5% and power of 90% was performed. The quality of each included trial was evaluated, and the quality of evidence was assessed using the Grading of Recommendation Assessment, Development, and Evaluation approach. We also assessed adverse events.

RESULTS: Sixty-four trials and 4303 patients (2300 and 2003 patients in
magnesium and control groups, respectively) were included. The overall incidence of shivering was 9.9% in the magnesium group and 23.0% in the control group (risk ratio, 0.42; 95% CI, 0.33-0.52). Subgroup analysis revealed that the incidence of shivering was lower with IV (risk ratio, 0.29; 95% CI, 0.29-0.54; Grading of Recommendation Assessment, Development, and Evaluation, moderate), epidural (risk ratio, 0.24; 95% CI, 0.13-0.43; Grading of Recommendation Assessment, Development, and Evaluation, low), and intrathecal administration (risk ratio, 0.64; 95% CI, 0.43-0.96; Grading of Recommendation Assessment, Development, and Evaluation, moderate). Only trials with low risk of bias were included for Trial Sequential Analysis. The Z-cumulative curve for IV magnesium crossed the Trial Sequential Analysis monitoring boundary for benefit even though only 34.9% of the target sample size had been reached. The Z-cumulative curve for epidural or intrathecal administration did not cross the Trial Sequential Analysis monitoring boundary for benefit. No increase in adverse events was reported.

CONCLUSIONS: Perioperative IV administration of magnesium effectively reduced shivering and Trial Sequential Analysis suggested that no more trials are required to confirm that IV magnesium effectively reduces shivering.

一項前瞻性觀察佇列研究，對大學附屬三級醫院手術室單元的求助的研究。

A Prospective Observational Cohort Study of Calls for Help in a Tertiary Care Academic Operating Room Suite

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Anesthesia & Analgesia: 2019 129 e83-e85

儘管有大量關於醫院“代碼呼叫”的文獻，但缺乏對手術室內幫助呼叫的相關研究。本研究的目的是量化在一所大學附屬醫院手術室內尋求幫助的比率和性質。在一年的時間裡，記錄所有加州大學歐文醫學中心主手術室的呼叫。每 1000 個麻醉小時的平均呼叫率為 1.4（95%CI 為 1.1-1.8），相當於每 1000 例麻醉呼叫率為 5.0（3.8-6.5）。最常見的呼叫原因是與氣道（44%）、心臟（32%）和出血（11%）相關的緊急情況。手術室內需要求助的患者 30 天死亡率接近 11%。

（吳潔譯 李士通校）

While significant literature exists on hospital-based ″code calls,″ there is a lack of research on calls for help in the operating room (OR). The purpose of this study was to quantify the rate and nature of calls for help in the OR of a tertiary care hospital. For a 1-year period, all calls were recorded in the main OR at The University of California, Irvine Medical Center. The average rate of calls per 1000 anesthesia hours was 1.4 (95% CI, 1.1-1.8), corresponding to a rate of 5.0 (3.8-6.5) calls per 1000 cases. Airway (44%), cardiac (32%), and hemorrhagic (11%) emergencies were the most common etiologies. Thirty-day mortality approached 11% for patients who required a call for help in the OR.

術後角膜損傷：發病率和危險因素

Postoperative Corneal Injuries: Incidence and Risk Factors

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Anesthesia & Analgesia: 2019 129 737-742

背景：先前對術後角膜損傷率的研究依賴于一些當事人提供的事件報告，這可能低估了真實的發病率。術後給予丙泊卡因滴眼液幾乎只用於診斷角膜損傷，因此，確定實際給藥病例可以更好地估計角膜損傷情況。我們比較了丙泊卡因給藥和提供者提供的報告，以確定角膜損傷的發生率。此外，通過相匹配的病例對照研究評估臨床變數和損傷之間的潛在關係。

方法：回顧了 132511 例先後進入麻醉後復蘇室（2011 年 1 月 1 日至 2017 年 6 月 30 日）的成年病人病歷，以確定術後給予丙胺卡因和角膜損傷的事件報告情況。角膜損傷患者以 1:2 的比例與對照組患者進行配對，以評估損傷相關因素。

結果：442 例患者使用丙胺卡因滴眼（其中 425 例患者為使用丙胺卡因做診斷性治療，17 例患者因無關原因接受丙胺卡因治療）。事件報告確定 320 例角膜損傷，角膜損傷總病例數為 436 例（發病率為每 1000 例全麻患者 3.3 例［95%置信區間 CI 為 3.0-3.6］。與事件報告相比，使用丙胺卡因的病例確定率更高（分別為 97.5%對 73.4%；P<0.001）。匹配的病例對照分析發現，麻醉持續時間較長（優勢比為 1.05 每 10 分鐘麻醉時間［95%可信區間為 1.03-1.07］；p<0.001）和非正位手術（優勢比為 3.89[95%可信區間，2.17-6.98］；p<0.001）的風險更大。在麻醉恢復期間，存在角膜損傷的患者在復蘇室內有更多的鎮靜和躁動的證據。

結論：使用幾乎專門用於診斷特定損傷（角膜損傷）的藥物（丙呱卡因滴眼液）計算發病率表明，病例確定率高於事件報告的方法。類似的策略可用於監測其他不良事件的發生率。

（吳潔譯 李士通校）

BACKGROUND: Previous studies of postoperative corneal injury rates relied on provider-initiated incident reports, which may underestimate the true incidence. Postoperative administration of proparacaine eye drops is used almost exclusively to diagnose corneal injury; therefore, identifying instances of administration may provide a better estimate of corneal injuries. We compared proparacaine administration versus provider-initiated reports to determine rates of corneal injury. In addition, potential associations between clinical variables and injury were assessed with a matched case-control study.

METHODS: The health records of 132,511 sequential adult postanesthesia recovery room admissions (January 1, 2011 to June 30, 2017) were reviewed to identify postoperative proparacaine administration and incident reports of corneal injury. Patients with corneal injury were matched with control patients at a 1:2 ratio to assess factors associated with

injury.
RESULTS: Proparacaine drops were administered to 442 patients (425 patients received proparacaine for diagnosis and 17 patients received proparacaine for unrelated reasons). Incident reports identified 320 injuries, and the aggregate corneal injury count was 436 (incidence, 3.3 injuries [95% confidence interval {CI}, 3.0-3.6] per 1000 cases of general anesthesia). Proparacaine administration had a greater case ascertainment percentage than incident reporting (97.5% vs 73.4%; P < .001). The matched case-control analysis found greater risks associated with longer duration of anesthesia (odds ratio, 1.05 [95% CI, 1.03-1.07] per 10 minutes of anesthesia; P < .001) and nonsupine surgical position (odds ratio, 3.89 [95% CI, 2.17-6.98]; P < .001). Patients with injuries also had more evidence of sedation and agitation during anesthesia recovery.
CONCLUSIONS: Calculation of incidence by using the administration of a medication (proparacaine eye drops) that is almost exclusively used to diagnose a specific injury (cornealinjury) showed higher case ascertainment percentage than incident-reporting methods. Similar strategies could be used to monitor the rates of other adverse events.

創傷中纖維蛋白溶解停止：歷史回顧與臨床意義

Fibrinolysis Shutdown in Trauma: Historical Review and Clinical Implications

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Anesthesia & Analgesia: 2019 129 762-773

儘管認識到在創傷後存在纖維蛋白溶解異常已經超過半個世紀，但在瞭解引起這些變化的潛在機制以及由此導致的無效治療策略方面我們仍然處於初期。隨著粘彈性止血試驗（VHAS）在創傷中纖維蛋白溶解測定中的應用越來越多，出現的問題比答案更多。雖然 VHA 測定的低纖溶活性似乎是損傷後常見的，並與死亡率的增加有關，但我們現在認識到該人群中的亞症狀類型，即特定的佇列出現取決於採集樣本時損傷的特定時間。未來的研究應該集中在這些細節和區別上，因為低纖維蛋白溶解、急性纖溶終止和持續纖溶終止似乎代表了不同的、獨特的臨床類

型，具有不同的病理生理學過程，並警示需要不同的治療策略。

（吳潔譯 李士通校）

Despite over a half-century of recognizing fibrinolytic abnormalities after trauma, we remain in our infancy in understanding the underlying mechanisms causing these changes, resulting in ineffective treatment strategies. With the increased utilization of viscoelastic hemostatic assays (VHAs) to measure fibrinolysis in trauma, more questions than answers are emerging. Although it seems certain that low fibrinolytic activity measured by VHA is common after injury and associated with increased mortality, we now recognize subphenotypes within this population and that specific cohorts arise depending on the specific time from injury when samples are collected. Future studies should focus on these subtleties and distinctions, as hypofibrinolysis, acute shutdown, and persistent shutdown appear to represent distinct, unique clinical phenotypes, with different pathophysiology, and warranting different treatment strategies.

硬膜外分娩鎮痛對母乳餵養的影響：一項混合產次佇列的前瞻性觀察佇列研究

The Effect of Labor Epidural Analgesia on Breastfeeding Outcomes: A Prospective Observational Cohort Study in a Mixed-Parity Cohort

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Anesthesia & Analgesia: 2019 129 784-791

背景：在一些有不同結果的研究中，分別評估了硬膜外分娩鎮痛（LEA）對成功母乳餵養的影響。在鼓勵母乳餵養的大環境中，我們假設 LEA 不會影響產後 6 周擬母乳餵養婦女的母乳餵養狀態。

方法：在這項前瞻性觀察性佇列研究中，共有 1204 名婦女擬行母乳餵養，在有或無 LEA 的情況下進行自然陰道分娩；在產後 3 天和 6 周記錄母乳餵養情況。主要結果是 6 周時母乳餵養情況，根據產次及以往母乳餵養情況，採用 x^2 檢驗比較使用 LEA 和未使用 LEA 分娩的產婦。記錄硬膜外使用芬太尼總劑量和催產素使用情況（是/否）。對影響 6 周母乳餵養的因素進行多變數 logistic 回歸分析。

結果：6 周時的母乳餵養率為 76.9%，使用 LEA 的產婦（74.0%）明顯低於未使用 LEA 的婦女（83.4%；p<0.001）。在 398 名初產婦中，有 84.9%使用 LEA 分娩，而經產婦有 61.8%使用 LEA（P<0.001）。經產婦（n=806）在 6 周時更有可能實施母乳餵養（經產婦的 80.0%對初產婦的 70.6%；P<0.001）。使用包含 14 個協變數（包括產次和使用 LEA 之間的相互作用項）的多變數 logistic 回歸，使用 LEA 與 6 周時母乳餵養的減少顯著相關（優勢比為 0.60；95%置信區間為 0.40-0.90；P=0.015）。在一個改進的多變數 logistic 回歸分析中，既往的母乳餵養經驗取代了產次，無論是作為協變數還是在交互作用期，只有既往的母乳餵養經驗與 6 周時母乳餵養的增加相關（優勢比為 3.17；95%置信區間為 1.72－5.80；P<0.001）。

結論：在我們的混合產次佇列中，使用 LEA 分娩與 6 周母乳餵養的可能性降低有關。然而，結合婦女以往的母乳餵養經驗，在使用或未 LEA 的經產婦中，母乳餵養比率沒有差異。因此，我們的研究結果表明，為沒有母乳餵養經驗的婦女提供哺乳支持可能是提高母乳餵養成功率的簡單方法。這一概念符合婦女在面臨不期望的結果的風險時，應以個性化的方式提供量身定制的干預措施的理念。

（吳潔譯 李士通校）

BACKGROUND: The effect of labor epidural analgesia (LEA) on successful breastfeeding has been evaluated in several studies with divergent results. We hypothesized that LEA would not influence breastfeeding status 6 weeks postpartum in women who intended to breastfeed in an environment that encourages breastfeeding.

METHODS: In this prospective observational cohort study, a total of 1204 women intending to breastfeed, delivering vaginally with or without LEA, were included; breastfeeding was recorded at 3 days and 6 weeks postpartum. Primary outcome was breastfeeding at 6 weeks, and the x^2 test was used for comparisons between women delivering with and without LEA, according to parity status and previous breastfeeding experience. Total epidural fentanyl dose and oxytocin use (yes/no) were recorded. A multivariable

logistic regression was performed to assess factors affecting breastfeeding at 6 weeks.

RESULTS: The overall breastfeeding rate at 6 weeks was 76.9%; it was significantly lower among women delivering with LEA (74.0%) compared with women delivering without LEA (83.4%; $P < .001$). Among 398 nulliparous women, 84.9% delivered with LEA, compared with 61.8% of multiparous women ($P < .001$). Multiparous women (N = 806) were more likely to breastfeed at 6 weeks (80.0% vs 70.6% nullipara; $P < .001$). Using multivariable logistic regression that accounted for 14 covariates including parity, and an interaction term between parity and LEA use, LEA was significantly associated with reduced breastfeeding at 6 weeks (odds ratio, 0.60; 95% confidence interval, 0.40–0.90; $P = .015$). In a modified multivariable logistic regression where parity was replaced with previous breastfeeding experience, both as a covariate and in the interaction term, only previous breastfeeding experience was associated with increased breastfeeding at 6 weeks (odds ratio, 3.17; 95% confidence interval, 1.72–5.80; $P < .001$).

CONCLUSIONS: In our mixed-parity cohort, delivering with LEA was associated with reduced likelihood of breastfeeding at 6 weeks. However, integrating women's previous breastfeeding experience, the breastfeeding rate was not different between women delivering with and without LEA among the subset of multiparous women with previous breastfeeding experience. Therefore, our findings suggest that offering lactation support to the subset of women with no previous breastfeeding experience may be a simple approach to improve breastfeeding success. This concept subscribes to the notion that women at risk for an undesired outcome be offered tailored interventions with a personalized approach.

接受非心臟手術的輸血患者術後初始血紅蛋白值和臨床結果

Initial Postoperative Hemoglobin Values and Clinical Outcomes in Transfused Patients Undergoing Noncardiac Surgery

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Anesthesia & Analgesia: 2019 129 819-829

背景：術中輸注紅細胞（RBC）很常見，但輸血策略仍存在爭議，因為在急性出血期間，很難利用常規輸血前血紅蛋白輸血指標值。另外，術後血紅蛋白值可提供有關輸血實踐的有用資訊，但最佳指標仍不明確。

方法：這是一項單中心觀察佇列研究，針對 2010 年至 2014 年非心臟手術期間接

受異體紅細胞的成人患者。對患者疾病、實驗室紊亂指標和手術特徵進行多變數回歸分析，以評估術後初始血紅蛋白值與住院日期等主要結局之間的關係。

結果：一共包括 8060 名患者。與參考範圍 9.5-10.4 g/dl（總 P 值 0.003）相比，初始術後血紅蛋白<7.5 或≥11.5 g/dl 的患者的住院天數[95%置信區間[CI] 平均值分別為-1.45(-2.50 至-0.41)和-0.83(-1.42 至-0.24)少於血紅蛋白 9.5－10.4 g/dL 的患者（總 P 值為 0.003）。對於血紅蛋白<7.5 g/dl 的患者，次要結局的概率（95%可信區間）包括急性腎損傷（AKI）為 1.43（1.03－1.99）、死亡率為 2.10（1.18－3.74）和腦缺血發生率為 3.12（1.08－9.01）。血紅蛋白≥11.5 g/dl 的術後機械通氣的概率為 1.33（1.07－1.65）。多次比較調整後的次要結果相關性不顯著（Bonferroni P<0.0056）。

結論：在輸血患者中，術後血紅蛋白值介於 7.5-11.5 g/dl 之間與更極端的值相比，具有更好的預後。該範圍可能代表術中輸血的目標，尤其是在活動性出血時，現有輸血前血紅蛋白閾值可能不實用或不準確。考慮到這一範圍內的類似結果，儘管有必要進行前瞻性驗證，但在較低層面說明靶向血紅蛋白目標輸注可能更可取。

（吳潔譯 李士通校）

BACKGROUND: Intraoperative red blood cell (RBC) transfusion is common, yet transfusion strategies remain controversial as pretransfusion hemoglobin triggers are difficult to utilize during acute bleeding. Alternatively, postoperative hemoglobin values may provide useful information regarding transfusion practices, though optimal targets remain undefined.

METHODS: This is a single-center observational cohort study of adults receiving allogeneic RBCs during noncardiac surgery from 2010 through 2014. Multivariable regression analyses adjusting for patient illness, laboratory derangements, and surgical features were used to assess relationships between initial postoperative hemoglobin values and a primary outcome of hospital-free days.

RESULTS: A total of 8060 patients were included. Those with initial postoperative hemoglobin <7.5 or ≥11.5 g/dL had decreased hospital-free days [mean (95% confidence interval [CI]), −1.45 (−2.50 to −0.41) and −0.83 (−1.42 to −0.24), respectively] compared to a reference range of 9.5–10.4 g/dL (overall *P* value .003). For those with hemoglobin <7.5 g/dL, the odds (95% CI) for secondary outcomes included acute kidney injury (AKI) 1.43 (1.03–1.99), mortality 2.10 (1.18–3.74), and cerebral ischemia 3.12 (1.08–9.01). The odds for postoperative mechanical ventilation with hemoglobin ≥11.5 g/dL were 1.33 (1.07–1.65). Secondary outcome associations were not significant after multiple comparisons adjustment (Bonferroni *P* < .0056).

CONCLUSIONS: In transfused patients, postoperative hemoglobin values between 7.5 and 11.5 g/dL were associated with superior outcomes compared to more extreme values. This range may represent a target for intraoperative transfusions, particularly during active bleeding when pretransfusion hemoglobin thresholds may be impractical or inaccurate. Given similar outcomes within this range, targeting hemoglobin at the lower aspect may be preferable, though prospective validation is warranted.

在術前麻醉診所合併脆弱性和認知篩查方案的可行性和理論基礎

Feasibility and Rationale for Incorporating Frailty and Cognitive Screening Protocols in a Preoperative Anesthesia Clinic

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Anesthesia & Analgesia: 2019 129 830-838

背景：據報導，高齡、虛弱、受教育程度低和認知障礙通常與術後認知併發症有關。為了將研究結果轉化為全醫院的術前評估臨床實踐，我們檢查了在一家附屬醫療中心擇期手術的所有老年人實施術前脆弱性和認知評估的可行性。我們使用時鐘和 3 字記憶評分估計了術前樣本中輕度至重度認知障礙的患病率，研究了年齡、受教育程度、虛弱與共存疾病之間的關係，並研究了住院時長的相關因素。

方法：醫務人員對年齡在 65 歲以上的成年人進行了虛弱程度、一般認知（通過時鐘繪圖測試命令和重複、3 字記憶測試）的篩查，並獲知受教育年限。可行性

研究分兩個階段進行：（1）試點階段涉及 4 名高級護士，以及（2）2 個月的實施階段涉及所有術前工作人員。我們追蹤缺失資料的來源，調查研究變數與認知測量的相關性，並使用 2 種方法來估計樣本病人患有癡呆的可能性（即，使用現有資料和邏輯回歸模型，並使用最小 COG 切割分數）。我們探討了與住院時間相關的方案變數。

結果：最終實施階段樣本包括 678 名患者。時鐘和 3 字記憶分數與年齡、虛弱程度和受教育程度顯著相關。不同手術類型的受教育程度、時鐘評分和 3 字評分無顯著差異。術前認知功能障礙的可能性約為 20%，手術類型無差異。住院時間與術前共存疾病和時鐘複製情況的表現顯著相關。

結論：虛弱程度和認知篩查方案是可行的，為圍手術期護理計畫提供資訊。臨床相應工作的挑戰包括工作人員培訓、防止資料缺失和額外的護理時間。這些挑戰似乎與在一個術後認知結果風險陰性的組中識別患者虛弱程度和認知障礙的益處無關。

（吳潔譯 李士通校）

BACKGROUND: Advanced age, frailty, low education level, and impaired cognition are generally reported to be associated with postoperative cognitive complications. To translate research findings into hospital-wide preoperative assessment clinical practice, we examined the feasibility of implementing a preoperative frailty and cognitive assessment for all older adults electing surgical procedures in a tertiary medical center. We examined associations among age, education, frailty, and comorbidity with the clock and 3-word memory scores, estimated the prevalence of mild to major cognitive impairment in the presurgical sample, and examined factors related to hospital length of stay.

METHODS: Medical staff screened adults ≥65 years of age for frailty, general cognition (via the clock-drawing test command and copy, 3-word memory test), and obtained years of education. Feasibility was studied in 2 phases: (1) a pilot phase involving 4 advanced nurse practitioners and (2) a 2-month implementation phase involving all preoperative staff. We tracked sources of missing data, investigated associations of study

variables with measures of cognition, and used 2 approaches to estimate the likelihood of dementia in our sample (ie, using extant data and logistic regression modeling and using Mini-Cog cut scores). We explored which protocol variables related to hospital length of stay.
RESULTS: The final implementation phase sample included 678 patients. Clock and 3-word memory scores were significantly associated with age, frailty, and education. Education, clock scores, and 3-word scores were not significantly different by surgery type. Likelihood of preoperative cognitive impairment was approximately 20%, with no difference by surgery type. Length of stay was significantly associated with preoperative comorbidity and performance on the clock copy condition.
CONCLUSIONS: Frailty and cognitive screening protocols are feasible and provide information for perioperative care planning. Challenges to clinical adaptation include staff training, missing data, and additional administration time. These challenges appear minimal relative to the benefits of identifying frailty and cognitive impairment in a group at risk for negative postoperative cognitive outcome.