血壓變異係數及其與心臟手術預後的關係

Blood Pressure Coefficient of Variation and Its Association With Cardiac Surgical Outcomes.

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背景：在門診非手術環境中完成的多項研究顯示，短期和長期血壓變異性與不良預後之間存在顯著相關性。然而，圍手術期血壓變異性對手術預後的影響尚未得到很好的研究，尤其是在心臟手術中。在這項研究中，作者試圖評估收縮動脈壓和平均動脈血壓變異是否與需要體外迴圈的心臟手術患者的 30 天死亡率和院內腎功能衰竭具有相關性。此外，既往研究沒有具體評估在手術的每個階段，即在術前，術中和術後階段血壓的變異性。因此本研究還旨在評估手術預後是否與階段特異性的收縮壓和平均動脈血壓變異性相關。

方法:從2008年1月至2014年6月所有接受心臟手術的患者均納入這項回顧性、單中心研究。人口統計學，術中和手術預後資料來自該機構的胸外科協會資料庫和麻醉資訊管理系統。使用變異係數（CV）評估收縮壓和平均動脈血壓變異性。主要預後指標是與病例的整個病程相關的 30 天死亡率和院內腎功能衰竭發生率，而次要預後指標評估了各個手術時期的階段特異性。為了控制整體誤差率，P 值 <0.0125 被認為對主要預後指標有重要意義。

結果：在分析的 3687 名患者中，2.7%的患者在手術後 30 天內死亡，2.8%的患者發生院內腎功能衰竭。在調整協變數後，作者發現收縮壓變異性（CVSBP）的增加與 30 天死亡率和院內腎功能衰竭之間存在顯著統計學相關性。 CVSBP 每增加 0.10，死亡概率增加 150%（優勢比，2.50; 95%置信區間，1.60-3.92; P <.0001)，發生腎臟衰竭概率增加 104%(優勢比，2.04; 95%置信區間，1.33-3.14;

P = .001）。與死亡率的關係主要發生在體外迴圈前期，因為 CVSBP 與死亡率之間的關聯在體外迴圈前期是顯著的（P = .01），非體外迴圈後期（P = .08）。在任何手術階段，包括體外迴圈期間，平均動脈血壓的變異性與死亡率或腎功能衰竭之間沒有顯著關聯。

結論：收縮壓變異率的增加與 30 天死亡率和腎衰竭的發展存在相關性，並且存在手術階段相關特異性。進一步的研究需要確定如何前瞻性地發現血壓變異性並闡明干預的時機

（蔣長青 譯　陳傑 校）

BACKGROUND: Multiple studies completed in the ambulatory nonsurgical setting show a significant association between short- and long-term blood pressure variability and poor outcomes. However, perioperative blood pressure variability outcomes have not been well studied, especially in the cardiac surgical setting. In this study, we sought to assess whether systolic and mean arterial blood pressure variability were associated with 30-day mortality and in-hospital renal failure in patients undergoing cardiac surgery requiring cardiopulmonary bypass. Furthermore, blood pressure variability has not been evaluated specifically during each phase of surgery, namely in the pre-, intra- and postbypass phases; thus, we aimed also to assess whether outcomes were associated with phase-specific systolic and mean arterial blood pressure variability.
METHODS: All patients undergoing cardiac surgery from January 2008 to June 2014 were enrolled in this retrospective, single-center study. Demographic, intraoperative, and postoperative outcome data were obtained from the institution's Society of Thoracic Surgery database and Anesthesia Information Management System. Systolic and mean arterial blood pressure variability were assessed using the coefficient of variation (CV). The primary outcomes were 30-day mortality and in-hospital renal failure in relation to the entire duration of a case, while the secondary outcomes assessed phase-specific surgical periods. In an effort to control the family-wise error rate, P values <.0125 were considered significant for the primary outcomes.
RESULTS: Of the 3687 patients analyzed, 2.7% of patients died within 30 days of surgery and 2.8% experienced in-hospital renal failure. After adjusting for significant covariates, we found a statistically significant association between increasing CV for systolic blood pressure (CVSBP) and 30-day mortality and in-hospital renal failure.

For every 0.10 increase in CVSBP, there was a 150% increase in the odds of death (odds ratio, 2.50; 95% confidence interval, 1.60-3.92; P < .0001) and there was a 104% increase in odds of experiencing renal failure (odds ratio, 2.04; 95% confidence interval, 1.33-3.14; P = .001). The association with mortality was driven primarily by the prebypass period, because the association between CVSBP and mortality during the prebypass phase was significant (P = .01), and not during the postbypass phase (P = .08). There was no significant association between CV for mean arterial blood pressure and either death or renal failure during any period of surgery, including the bypass phase.
CONCLUSIONS: Increasing systolic blood pressure variability was associated with 30-day mortality and development of renal failure, with surgery phase-specific relationships observed. Further research is required to determine how to prospectively detect blood pressure variability and elucidate opportunities for intervention.

肝臟切除術圍術期管理：硬膜外阻滯效果的比較以及監護模式的差異

Perioperative Management in Hepatic Resections: Comparative Effectiveness of Neuraxial Anesthesia and Disparity of Care Patterns.

Zerillo J, Agarwal P, Poeran J, Zubizarreta N, Poultsides G, Schwartz M, Memtsoudis S, Mazumdar M, DeMaria S Jr1.
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背景：肝臟切除術後的併發症發生率受到醫院監護團隊的管理決策和/或監護差異的影響。 在許多其他類型手術中也是如此，但對肝臟切除術後併發症發病率與監護的差異相關性的研究卻很少。

方法：研究資料來源於 2006-2014 年度發生理賠事件的國家 Premier Perspective 資料庫。分析樣本包括接受部分肝切除術和全肝切除術的成人，麻醉監護包括單純全身麻醉（GA）和全身麻醉聯合椎管內阻滯（n = 9442）。該研究關鍵的引數是麻醉類型，分為 GA 與 GA +椎管內阻滯。預後指標為臨床併發症和醫療資源利用。研究在控制患者和醫院層次的特徵後，進行未經調整的雙變數和調整的多變數分析以期發現不同類型的麻醉對臨床併發症和醫療資源利用的影響。

結果：肝臟切除術中約有 9%的患者接受了 GA +椎管內阻滯。在多變數分析中，沒有觀察到麻醉類型與臨床併發症和/或醫療監護利用之間的關聯（例如，入重症監護室）。然而，接受輸血治療的患者更易出現術後併發症和進入重症監護室。此外，某些監護差異，包括在鄉村醫院接受手術，與較差的術後轉歸相關。

結論：與單純 GA 的患者相比，聯合應用椎管內阻滯與肝臟切除術後患者的轉歸或醫療成本的改善無關。未來研究將會關注前瞻性資料，並提供有關此類患者的更多臨床資訊，同時調查 GA +椎管內阻滯麻醉對各種併發症和醫療資源利用的影響。

（張驍 譯　陳傑 校）

BACKGROUND: Complication rates after hepatic resection can be affected by management decisions of the hospital care team and/or disparities in care. This is true in many other surgical populations, but little study has been done regarding patients undergoing hepatectomy.
METHODS: Data from the claims-based national Premier Perspective database were used for 2006 to 2014. The analytical sample consisted of adults undergoing partial hepatectomy and total hepatic lobectomy with anesthesia care consisting of general anesthesia (GA) only or neuraxial and GA (n = 9442). The key independent variable was type of anesthesia that was categorized as GA versus GA + neuraxial. The outcomes examined were clinical complications and health care resource utilization. Unadjusted bivariate and adjusted multivariate analyses were conducted to examine the effects of the different types of anesthesia on clinical complications and health care resource utilization after controlling for patient- and hospital-level characteristics.
RESULTS: Approximately 9% of patients were provided with GA + neuraxial anesthesia during hepatic resection. In multivariate analyses, no association was observed between types of anesthesia and clinical complications and/or health care utilization (eg, admission to intensive care unit). However, patients who received blood transfusions were significantly more likely to have complications and intensive care unit stays. In addition, certain disparities of care, including having surgery in a rural hospital, were associated with poorer outcomes.

CONCLUSIONS: Neuraxial anesthesia utilization was not associated with improvement in clinical outcome or cost among patients undergoing hepatic resections when compared to patients receiving GA alone. Future research may focus on prospective data sources with more clinical information on such patients and examine the effects of GA + neuraxial anesthesia on various complications and health care resource utilization.

患者自控與臨床醫生控制的異丙酚鎮靜：一項包含試驗序貫分析的系統性回顧和 Meta 分析

Patient-Controlled Versus Clinician-Controlled Sedation With Propofol: Systematic Review and Meta-analysis With Trial Sequential Analyses.

Kreienbühl L, Elia N, Pfeil-Beun E, Walder B, Tramèr MR.
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背景：臨床診治操作期間通常使用異丙酚進行鎮靜。它可以經由患者（患者自控的鎮靜[PCS]）或臨床醫生（臨床醫生控制的鎮靜[CCS]）給藥。本研究目的是比較這兩種給藥方式的差異。

方法：收集 2017 年 10 月前 PubMed、Embase、CENTRAL 和試驗註冊網站上有關 PCS 和 CCS 比較的隨機對照試驗。主要終點是存在一過性氧飽和度降低、低血壓和心動過緩的風險，以及發生與鎮靜相關需要搶救干預（藥物治療或物理操作）的不良事件的風險。次要終點是給予異丙酚的劑量，操作者和患者的滿意度以及過度鎮靜的風險。自始至終使用隨機效應模型和取 α=0.02 以調整進行多次分析，並對主要結果進行試驗序貫分析。根據推薦等級、評估、開發和評估系統評估證據品質。

結果：本研究納入了 13 項描述使用異丙酚進行各種診療操作鎮靜的臨床試驗（1103 名患者，中位年齡 47 歲；ASA I～III 級）。分析發現 PCS 對發生氧飽和度降低的風險沒有影響（11 項試驗，31/448 例患者[6.9%]使用 PCS 而 46/481

[9.6%]採用 CCS；風險比率為 0.74 [98%置信區間，0.35-1.56]），但降低了對不良事件進行搶救干預的風險（11 項試驗，29/449 例患者[6.5%]使用 PCS，而 74/482 [15.4%]採用 CCS；風險比，0.45 [98%置信區間，0.25-0.81]）。對於這兩種結果，儘管所有主要結果的證據品質都非常低，但是試驗序貫分析表明進一步試驗也不太可能改變這個結果。對於低血壓和心動過緩的風險，尚未達到確定結論所需的樣本量。對次要結果的分析表明 PCS 降低了過度鎮靜的風險，並且對異丙酚使用劑量、對操作者或患者滿意度沒有影響。

結論：與 CCS 相比，使用異丙酚進行 PCS 時並未改變氧飽和度下降的風險，但顯著降低了發生鎮靜相關不良事件的搶救干預風險。未來需要進行高品質的臨床試驗來評估 PCS 的風險和益處。

（周江平 譯　陳傑 校）

BACKGROUND: Sedation with propofol is frequently used to facilitate diagnostic and therapeutic procedures. Propofol can be administrated by the patient (patient-controlled sedation [PCS]) or by a clinician (clinician-controlled sedation [CCS]). We aimed to compare these 2 techniques.

METHODS: PubMed, Embase, CENTRAL, and trial registries were searched up to October 2017 for randomized controlled trials comparing PCS with CCS with propofol. The primary end points were the risks of presenting at least 1 episode of oxygen desaturation, arterial hypotension, and bradycardia, and the risk of requiring a rescue intervention (pharmacologic therapies or physical maneuvers) for sedation-related adverse events. Secondary end points were the dose of propofol administrated, operator and patient satisfaction, and the risk of oversedation. A random-effects model and an α level of .02 to adjust for multiple analyses were used throughout. Trial sequential analyseswere performed for primary outcomes. Quality of evidence was assessed according to the Grades of Recommendation, Assessment, Development, and Evaluation system.

RESULTS: Thirteen trials (1103 patients; median age, 47 years; American Society of Anesthesiologists physical status I-III) describing various diagnostic and therapeutic procedures with propofol sedation were included. PCS had no impact on the risk

of oxygen desaturation (11 trials, 31/448 patients [6.9%] with PCS versus 46/481 [9.6%] with CCS; risk ratio, 0.74 [98% confidence interval, 0.35-1.56]) but decreased the risk of requiring a rescue intervention for adverse events (11 trials, 29/449 patients [6.5%] with PCS versus 74/482 [15.4%] with CCS; risk ratio, 0.45 [98% confidence interval, 0.25-0.81]). For both outcomes, Trial sequential analyses suggested that further trials were unlikely to change the results, although the quality of evidence was graded very low for all primary outcomes. For the risk of arterial hypotension and bradycardia, the required sample size for a definitive conclusion had not been reached. Analysis of secondary outcomes suggested that PCS decreased the risk of oversedation and had no impact on propofol dose administrated, or on operator or patient satisfaction.
CONCLUSIONS: PCS with propofol, compared with CCS with propofol, had no impact on the risk of oxygen desaturation, but significantly decreased the risk of rescue interventions for sedation-related adverse events. Further high-quality trials are required to assess the risks and benefits of PCS.

全髖關節和全膝關節置換術術前大劑量甲基強的松龍和術後早期控制血糖:一項隨機，雙盲，安慰劑對照試驗

Preoperative High-Dose Methylprednisolone and Glycemic Control Early After Total Hip and KneeArthroplasty: A Randomized, Double-Blind, Placebo-Controlled Trial.
Lindberg-Larsen V, Kehlet H, Bagger J, Madsbad S.
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背景：評估術前單次給予 125 mg 甲強龍（MP）對全髖關節和全膝關節置換術後早期血糖穩態的影響。

方法:134 名接受單側全髖關節置換術和全膝關節置換術的患者隨機分配(1:1)至術前靜脈注射甲強龍 125 mg（MP 組）或術前靜脈注射等滲鹽水（C 組）。所有操作都是在脊麻下進行，使用標準化的多模式鎮痛方案。主要觀察指標是術後 2 小時血漿葡萄糖的變化，次要指標包括血漿 C 肽濃度，穩態模型評估(HOMA)，HOMA-IR(胰島素抵抗)和 HOMA-B(β 細胞功能)。收集 122 名禁食患者在基線、

術後 2 小時、術後 6 小時（僅限於非禁食患者）、術後 24 小時和術後 48 小時的完整血液樣品進行分析。

結果：MP 組術後 2 小時（修正後的均值 [95% CI], 7.4 mmol • L-1 [7.2 - 7.5] vs 6.0 mmol • L-1 [5.9 - 6.2]; P =0 .023）和術後 6 小時（13.9 mmol • L-1 [13.3 - 14.5] vs 8.4 mmol·L-1 [7.8 - 9.0]; P < .001）血漿葡萄糖水平增高，C-肽在術後 24 小時（1675 pmol • L-1 [1573 - 1778] vs 1248 pmol·L-1 [1145 - 1351]; P < .001）增加。如 HOMA-B 所反映的，在 MP 組中也觀察到胰島素反應受損(P <0.001)。 此外，與 C 組相比，MP 組術後 24 小時 HOMA-IR 增加(P <0.001)。參數在術後 48 小時恢復正常。

結論：術前給予甲強龍 125 mg 導致術後短暫的血糖增加、胰島素抵抗以及應對血糖增加的胰島素分泌受損。

（宋英才 譯　陳傑 校）

BACKGROUND: To evaluate the effect of a single preoperative dose of 125 mg methylprednisolone (MP) on glycemic homeostasis early afterfast-track total hip and knee arthroplasty.

METHODS: One-hundred thirty-four patients undergoing elective unilateral total hip arthroplasty and total knee arthroplasty were randomized(1:1) to preoperative intravenous MP 125 mg (group MP) or isotonic saline intravenous (group C). All procedures were performed under spinal anesthesia, using a standardized multimodal analgesic regime. The primary outcome was the change in plasma glucose 2 hours postoperatively, and secondary outcomes included plasma C-peptide concentrations, homeostatic model assessment (HOMA), HOMA-IR (insulin resistance), and HOMA-B (β-cell function). Fasting blood samples were collected at baseline and 2, 6 (nonfasting), 24, and 48 hours after surgery with complete samples from 122 patients (group MP = 62, group C = 60) for analyses.

RESULTS: MP patients had increased plasma glucose levels at 2 hours (adjusted mean [95% CI], 7.4 mmol • L [7.2-7.5] vs 6.0 mmol • L [5.9-6.2];

P = .023) and 6 hours (13.9 mmol • L [13.3-14.5] vs 8.4 mmol • L [7.8-9.0]; P < .001), and in plasma C-peptide 24 hours postoperatively (1675 pmol • L [1573-1778] vs 1248 pmol • L [1145-1351]; P < .001). An impaired insulin response was also observed in group MP as reflected by HOMA-B (P < .001). Additionally, HOMA-IR increased 24 hours postoperatively in group MP compared to group C (P < .001). Parameters were normalized 48 hours postoperatively.
CONCLUSIONS: Preoperative administration of MP 125 mg resulted in a transient postoperative increase in plasma glucose and insulin resistance and impaired insulin secretion in response to hyperglycemia.

胸主動脈瘤及夾層動脈瘤出血患者的復蘇

Resuscitation of Endotheliopathy and Bleeding in Thoracic Aortic Dissections: The VIPER-OCTA Randomized Clinical Pilot Trial

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胸主動脈夾層是一種與休克引起的血管內皮細胞病、凝血病、大出血以及嚴重的發病率和死亡率相關的急性危重病症。我們的目的是比較經 S/D 處理法處理的冰凍健康人血混合血漿（OctaplasLG）對比標準新鮮冰凍血漿（FFP）對多糖-蛋白質複合物和內皮損傷、出血和輸血的要求進行比較。由研究者發起的單中心盲法隨機臨床試驗，對接受胸主動脈夾層手術的成人患者進行臨床試驗。患者被隨機分配接受 OctaplasLG 或標準 FFP 作為與出血有關的凝血替代因數。主要的結果是多糖-蛋白質複合物和內皮損傷，其他的結果包括在 24 小時出血、輸血和止血、器官衰竭，在重症監護室和醫院的停留時間，安全性以及死亡時間分別為 30 天和 90 天。 其中 57 名患者內有 44 名獲得了可評估的主要結果。與標準 FFP 相比，OctaplasLG 組在血管內皮細胞損傷（粘結合蛋白多糖-1）和內皮細胞的緊密連接損傷（人可溶性血管內皮鈣粘附素）方面有著明顯的降低。OctaplasLG 組與標準 FFP 組相比，呼吸機使用天數（1 天 [四分差，0-1] vs 2 天 [1-3]； P = .013），

術中出血（2150 [1600-3087] vs 2750 [2130-6875]； P = .046），24 小時總輸血量和血小板輸血量（3975 mL [2640-6828 mL] vs 6220 mL [4210-10,245 mL]；P = .040，和 1400 mL [1050-2625 mL] vs 2450 mL [1400-3500 mL]; P = .027），且止血藥的有意使用(7/23 [30.4%] vs 13/21 [61.9%]; P = .036) 都明顯降低。在隨機分組的 57 例患者中，OctaplasLG 組 30 天死亡率為 20.7%（6/29），標準 FFP 組為 30%（7/28）（P = .760）。沒有提出任何安全性問題。在這項針對接受胸主動脈夾層急診手術的患者的隨機臨床試驗中，我們發現相較於標準 FFP，OctaplasLG 可減少多糖-蛋白質複合物和內皮損傷，減少出血、輸血、使用止血藥的頻率，以及手術後呼吸機的使用時間。為了證實臨床重要性發現，必須進行一個充分的多中心試驗。

（符奕青譯 潘豔、薛張綱校）

Thoracic aorta dissection is an acute critical condition associated with shock-induced endotheliopathy, coagulopathy, massive bleeding, and significant morbidity and mortality. Our aim was to compare the effect of coagulation support with solvent/detergent-treated pooled plasma (OctaplasLG) versus standard fresh frozen plasma (FFP) on glycocalyx and endothelial injury, bleeding, and transfusion requirements.Investigator-initiated, single-center, blinded, randomized clinical pilot trial of adult patients undergoing emergency surgery for thoracic aorta dissection. Patients were randomized to receive OctaplasLG or standard FFP as coagulation factor replacement related to bleeding. The primary outcome was glycocalyx and endothelial injury. Other outcomes included bleeding, transfusions and prohemostatics at 24 hours, organ failure, length of stay in the intensive care unit and in the hospital, safety, and mortality at 30 and 90 days.Fifty-seven patients were included to obtain 44 evaluable on the primary outcome. The OctaplasLG group displayed significantly reduced damage to the endothelial glycocalyx (syndecan-1) and reduced endothelial tight junction injury (sVE-cadherin) compared to standard FFP. In the OctaplasLG group compared to the standard FFP, days on ventilator (1 day [interquartile range, 0-1] vs 2 days [1-3]; P = .013), bleeding during surgery (2150 [1600-3087] vs 2750 [2130-6875]; P = .046), 24-hour total transfusion and platelet transfusion volume (3975 mL [2640-6828 mL] vs 6220 mL [4210-10,245 mL]; P = .040, and 1400 mL [1050-2625 mL] vs 2450 mL [1400-3500 mL]; P = .027), and goal-directed use of prohemostatics (7/23 [30.4%] vs 13/21 [61.9%]; P = .036) were all significantly lower. Among the 57 patients randomized, 30-day mortality was 20.7% (6/29) in the OctaplasLG group and 25% (7/28) in the standard FFP group (P = .760). No safety concern was raised.In this randomized, clinical pilot trial of patients undergoing

emergency surgery for thoracic aorta dissections, we found that OctaplasLG reduced glycocalyx and endothelial injury, reduced bleeding, transfusions, use of prohemostatics, and time on ventilator after surgery compared to standard FFP. An adequately powered multicenter trial is warranted to confirm the clinical importance of the findings.

門診手術中 2 型糖尿病患者持續與中斷口服降糖藥的比較：一項隨機對照實驗

Preoperative Continuation Versus Interruption of Oral Hypoglycemics in Type 2 Diabetic Patients Undergoing Ambulatory Surgery: A Randomized Controlled Trial.

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2 型糖尿病患者在術前經常被叮囑停止口服降糖藥物，我們假設術前持續口服降糖藥物的患者將導致圍術期血糖水準降低，將門診手術中口服降糖藥物的 2 型糖尿病患者隨機分為兩組，分別為術前繼續口服降糖藥組（n=69）和中止口服降糖藥組（n=73），分析術前、術中和術後的血糖（對數轉換後）水準。持續口服降糖藥物組的術中血糖水準（$\bar{x}$=156mg/dL；95%CI，130-146mg/dL）明顯低於中斷口服降糖藥物組（$\bar{x}$=138mg/dL；95%CI，146-167mg/dL；P<0.001）。

（楊雨迎 譯 潘豔、薛張綱校）

Patients with type 2 diabetes mellitus receiving oral hypoglycemic drugs (OHDs) are usually instructed to stop them before surgery. We hypothesize that continuing OHD preoperatively should result in lower perioperative blood glucose (BG) levels. Ambulatory surgery patients with type 2 diabetes mellitus on OHDs were randomized to continue (n = 69) or withhold (n = 73) OHDs preoperatively. Log-transformed BG levels at pre-, intra-, and postoperative periods were analyzed. Perioperative BG levels were significantly lower (mean, 138 mg/dL; 95% confidence interval, 130-146 mg/dL) in the group that continued versus the group that discontinued OHDs (mean, 156 mg/dL; 95% confidence interval, 146-167 mg/dL; P < .001).

常規術前血液檢查時機與術後 30 天圍術期發病率和死亡率之間的關係

The Association Between Timing of Routine Preoperative Blood Testing and a Composite of 30-Day Postoperative Morbidity and Mortality.

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背景：實驗室檢查是麻醉前評估的一個常見部分，其目的是識別可能不能通過檢查以外的手段發現的醫學上的異常狀態。雖然血液檢查最好在手術前的短時間內完成，但出於實際原因，它通常進行的更早。本文旨在驗證這樣一個假設：術前實驗室檢查和手術之間相隔的時間越長，術後 30 天併發症發病率和死亡率越高。

方法：我們從美國外科醫師學會國家外科品質改進計畫中收集了 2005 年至 2012 年間共 2,320,920 名患者的術前數據。我們在分析資料時僅納入了 ASA 分級 I-II 級的相對健康的患者，這些患者進行的是擇期手術，並且血液檢查結果都是正常的（n=235,010）。我們感興趣的主要指標是術後 30 天發病率和死亡率，與術前檢查和手術開始的延遲時間之間的函數關係。我們採用了多變數 logistic 回歸模型，就 30 天發病率對 5 個實驗室檢查時間組（術前 1 周內進行血實驗室檢查；1-2 周；2-4 周；1-2 月；2-3 月）的 10 組資料進行成對比較，並調整了所有基線不平衡的共變數和手術類型。

結果：共有 4082 名患者（1.74%）發生了至少一種併發症，或在術後 30 天內死亡。最近一次進行血液實驗室檢查的時間是術前 1 周內時，觀察到的發病率（未調整）是 1.7%；時間是 1-2 周時，發病率是 1.7%；2-4 周，發病率 1.8%；1-2

月，發病率 1.7%；當最近一次進行血液實驗室檢查的時間是術前 2-3 個月時，發病率是 2.0%。2 個月內的所有數值無統計學意義：與 1-2 周時間組相比，1 周內接受血液檢查的患者的估計比值比為 1.00（99.5%置信區間，0.89-1.12），2-4 周時間組的比值比為 0.88（0.77-1.00），1-2 月內的比值比為 0.95（0.79-1.14）。以 1-2 周時間組為對照，2-4 周和 1-2 月的估計比值比分別為 0.88（0.76-1.03）和 0.95（0.78-1.16）。與那些最近一次完成血液檢查的時間是術前 1 周內或 1-2 周內的患者相比，術前 2-3 月接受血液檢查與結局比值的增加有關（P=.002）。

結論：在 ASA 分級 I-II 級的患者中，實驗室檢查延長至術前 2 月的 30 天發病率與死亡率的風險沒有顯著差異，說明沒有必要在術前短時間內重新進行檢查。

（陳瑩 譯 潘豔、薛張綱校）

BACKGROUND: Laboratory testing is a common component of preanesthesia evaluation and is designed to identify medical abnormalities that might otherwise remain undetected. While blood testing might optimally be performed shortly before surgery, it is often done earlier for practical reasons. We tested the hypothesis that longer periods between preoperative laboratory testing and surgery are associated with increased odds of having a composite of 30-day morbidity and mortality.
METHODS: We obtained preoperative data from 2,320,920 patients in the American College of Surgeons National Surgical Quality Improvement Program who were treated between 2005 and 2012. Our analysis was restricted to relatively healthy patients with American Society of Anesthesiology physical status I-II who had elective surgery and normal blood test results (n = 235,010). The primary relationship of interest was the odds of 30-day morbidity and mortality as a function of delay between preoperative testing and surgery. A multivariable logistic regression model was used for the 10 pairwise comparisons among the 5 laboratory timing groups (laboratory blood tests within 1 week of surgery; 1-2 weeks; 2-4 weeks; 1-2 months; and 2-3 months) on 30-day morbidity, adjusting for any imbalanced baseline covariables and type of surgery.
RESULTS: A total of 4082 patients (1.74%) had at least one of the component morbidities or died within 30-days after surgery. The observed incidence (unadjusted) was 1.7% when the most recent laboratory blood tests measured within 1 week of surgery, 1.7% when it was within 1-2 weeks, 1.8% when it was within 2-4 weeks, 1.7% when it was between 1 and 2 months, and 2.0% for patients with most recent laboratory blood tests measured 2-3 months before surgery. None of the values within 2 months differed significantly: estimated odds ratios for patients within blood tested

within 1 week were 1.00 (99.5% confidence interval, 0.89-1.12) as compared to 1-2 weeks, 0.88 (0.77-1.00) for 2-4 weeks, and 0.95 (0.79-1.14) for 1-2 months, respectively. The estimated odds ratio comparing 1-2 weeks to each of 2-4 weeks and 1-2 months were 0.88 (0.76-1.03) and 0.95 (0.78-1.16), respectively. Blood testing 2-3 months before surgery was associated with increased odds of outcome compared to patients whose most recent test was within 1 week (P = .002) and 1-2 weeks of the date of surgery.
CONCLUSIONS: In American Society of Anesthesiologists physical status I and II patients, risk of 30-day morbidity and mortality was not different with blood testing up to 2 months before surgery, suggesting that it is unnecessary to retest patients shortly before surgery.

針對肥胖患者效應室靶控輸注的模型推導及效果評價

Effect-Site Target-Controlled Infusion in the Obese: Model Derivation and Performance Assessment

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背景：本研究的目的是建立一個異丙酚的藥代（PK）藥效（PD）動力學模型用以推導肥胖患者的效應室靶控輸注（TCI），並與其它現有的藥代動力學模型進行性能比較。

方法：在研究的第一步，將三室模型通過一階速率常數(keo)代入 s 曲線抑制最大效應的藥效模型，來擬合異丙酚濃度-腦電雙頻指數(BIS)的資料。我們在 NONMEM (ICON, 都柏林, 愛爾蘭)採用非線性混合效應回歸分析進行群體模型的分析。匯總並同時分析之前 3 項針對成年肥胖患者的研究的藥代數據(n=47)，包括其中一項研究的藥效資料(BIS) (n=20)。NONMEM 目標變應量下降(ΔOBJ) 3.84 分,作為一個附加參數,被認為顯著差異在 0.05 水準。在研究的第二步，我們使用獨立的資料集(n = 14)分析了當前模型和其他可用模型的預測性能(中位數預測誤差[MDPE]和中位數絕對預測誤差[MDAPE])。

結果：第一部分：選定藥代藥效動力學模型對資料進行適當擬合。總體重推算最合適的劑量和清除率 (ΔOBJ，−18.173)。憑經驗變異的總體重關係並沒有改善模型的擬合(ΔOBJ, 0.309)。BIS 回應的延遲時間參數提高了擬合度(ΔOBJ,89.593)。沒有觀察到年齡或性別的影響。第二部分：當前模型中位數預測誤差和中位數絕對預測誤差在藥代學部分為 11.5%(3.7-25.0)和 26.8%(20.7-32.6)，在藥效學部分為 0.4%(10.39-3.85)和 11.9%(20.7-32.6)。由 Eelveld 等人開發的藥代學模型得到了最小藥代學預測誤差(中位數預測誤差小於等於 10%以及中位數絕對預測誤差小於等於 25% ）。

結論：我們推導並驗證了一個針對肥胖患者的異丙酚藥代藥效的效應室靶控輸注模型。僅從肥胖患者的資料中匯出的這個模型不推薦用於瘦的患者，因為具有劑量不足的風險。

(李艾倫 譯 潘豔、薛張綱校)

BACKGROUND: The aim of this study is to derive a propofol pharmacokinetic (PK) pharmacodynamic (PD) model to perform effect-site target-controlled infusion (TCI) in obese patients, and to analyze its performance along with that of other available PK models.
METHODS: In the first step of the study, a 3-compartment PK model linked to a sigmoidal inhibitory E_{max} PD model by a first-order rate constant (keo) was used to fit propofol concentration–bispectral index (BIS) data. Population modeling analysis was performed by nonlinear mixed effects regression in NONMEM (ICON, Dublin, Ireland). PK data from 3 previous studies in obese adult patients (n = 47), including PD (BIS) data from 1 of these studies (n = 20), were pooled and simultaneously analyzed. A decrease in NONMEM objective function (ΔOBJ) of 3.84 points, for an added parameter, was considered significant at the 0.05 level. In the second step of the study, we analyzed the predictive performance (median predictive errors [MDPE] and median absolute predictive errors [MDAPE]) of the current model and of other available models using an independent data set (n = 14).
RESULTS: Step 1: The selected PKPD model produced an adequate fit of the data. Total body weight resulted in the best size scalar for volumes and clearances (ΔOBJ, −18.173). Empirical allometric total body weight relationships did not improve model fit (ΔOBJ, 0.309). A lag time parameter for BIS response improved the fit (ΔOBJ, 89.593). No effect of age or gender was observed. Step 2:

Current model MDPE and MDAPE were 11.5% (3.7–25.0) and 26.8% (20.7–32.6) in the PK part and 0.4% (−10.39 to 3.85) and 11.9% (20.7–32.6) in the PD part. The PK model developed by Eleveld et al resulted in the lowest PK predictive errors (MDPE = <10% and MDAPE = <25%).
CONCLUSIONS: We derived and validated a propofol PKPD model to perform effect-site TCI in obese patients. This model, derived exclusively from obesepatient's data, is not recommended for TCI in lean patients because it carries the risk of underdosing.

有害的還是生理性的：旋轉血栓彈力圖用於診斷纖溶關閉的創傷佇列研究

Harmful or Physiologic: Diagnosing Fibrinolysis Shutdown in a Trauma Cohort With Rotational Thromboelastometry

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儘管異常的纖維蛋白溶解在早期創傷性凝血功能障礙中起重要作用，但對其仍知之甚少。過量的纖維蛋白溶解是最終導致死亡的已知因素。最近的血栓彈力圖（TEG）研究表明，纖維蛋白溶解的減少（或關閉）可能同樣有害。考慮到廣泛使用的不可互換的 2 種不同的粘彈性試驗，我們首次提出使用旋轉血栓彈力圖（ROTEM）來定義和表徵纖維蛋白溶解終止。使用旋轉血栓彈力圖對嚴重創傷患者進行回顧性佇列研究。纖溶關閉由最大溶解的最佳 Youden 指數值定義。纖維蛋白溶解表現為生理學，纖溶亢進和關閉。多元邏輯回歸分析了創傷嚴重程度評分與纖維蛋白溶解表型之間，以及纖溶關閉表型與死亡率，輸血和血栓形成事件之間的關聯。550 名患者入選實驗。最大溶解<3.5%即定義為纖溶關閉。主要表現為生理性（70.7%），其次是纖溶關閉（25.6%）和纖溶亢進（3.6%）。纖溶關閉患者的創傷嚴重程度評分較高，城剩餘值較低，並且較生理組需要更多的輸

血量。纖溶關閉與酸中毒有關（城剩餘：優勢比[OR]為增加 1 mEq / L，0.93; 95％置信區間[CI]為 0.88-0.98; P =0.0094），合併凝血功能紊亂，血凝塊硬度更高（最大凝塊形成：凝塊每增加 2 mm 的 OR 值為 1.8; 95％CI 值為 1.5-2.27; P <0.0001），纖維蛋白原降低（每降低 0.5 g / dL OR 值為 1.47; 95％CI 值為 1.18-1.84 ; P =0.0006），並且凝塊形成動力學差（凝塊形成時間增加 5 秒 OR 值為 1.25; 95％CI 值為 1.15-1.36; P <0.0001）。纖維蛋白溶解關閉不是與死亡率相關的獨立因素（OR 值為 0.61; 95％CI 為 0.28-1.33; P =0.21），大量輸血（OR 值為 2.14; 95％CI 為 0.79-5.74; P =0.1308）或血栓形成事件（OR 值為 1.08; 95％CI 值為 0.37-3.15; P =0.874）。纖溶關閉與 24 小時輸血量增加有關（OR 值為 2.24; 95％CI 值為 1.24-4.04; P =0.007）。儘管傷害負擔較高，有休克證據，輸血需求較大，但早期纖維蛋白溶解關閉與死亡率無關，表明它可能代表對危及生命的創傷的適應性生理反應。

（劉琨譯 李士通校）

Despite its central role in early trauma coagulopathy, abnormal fibrinolysis continues to be poorly understood. Excessive fibrinolysis is a known contributor to mortality. Recent studies with thromboelastography (TEG) suggest decreased fibrinolysis (or shutdown) may be just as harmful. Considering the broad use of 2 different viscoelastic assays, which are not interchangeable, we proposed for the first time to define and characterize fibrinolysis shutdown using rotational thromboelastometry (ROTEM). Retrospective cohort study of severely injured patients with admission ROTEM. Shutdown was defined by the best Youden index value of the maximum lysis. Fibrinolysis phenotypes were physiologic, hyperfibrinolysis, and shutdown. Multivariable logistic regression evaluated association between Injury Severity Score and the fibrinolysis phenotypes, and the association among shutdown phenotype with mortality, blood transfusion, and thrombotic events. Five hundred fifty patients were included. Maximum lysis <3.5% was selected to define shutdown. Predominant phenotype was physiologic (70.7%), followed by shutdown (25.6%) and hyperfibrinolysis (3.6%). Shutdown patients had higher Injury Severity Score, lower base excess, and required more transfusions than physiologic group. Shutdown was associated with acidosis (base excess: odds ratio [OR] for a 1 mEq/L increase, 0.93; 95% confidence interval [CI], 0.88-0.98; P = .0094) and the combination of clotting derangements, higher clot firmness (maximum clot formation: OR for a 2 mm increase, 1.8; 95% CI, 1.5-2.27; P < .0001), lower fibrinogen (OR for a 0.5 g/dL

decrease, 1.47; 95% CI, 1.18-1.84; P = .0006), and poor clot formation dynamics (clot formation time: OR for a 5 seconds increase, 1.25; 95% CI, 1.15-1.36; P < .0001). Fibrinolysis shutdown was not independently associated with mortality (OR, 0.61; 95% CI, 0.28-1.33; P = .21), massive transfusion (OR, 2.14; 95% CI, 0.79-5.74; P = .1308), or thrombotic events (OR, 1.08; 95% CI, 0.37-3.15; P = .874). Shutdown was associated with increased 24-hour transfusion (OR, 2.24; 95% CI, 1.24-4.04; P = .007). Despite higher injury burden, evidence of shock, and greater need for blood transfusions, early fibrinolysis shutdown was not associated with mortality, suggesting that it could represent an adaptive physiologic response to life-threatening trauma.

肥胖患者靶控輸注的效應室：模型推導及效果評價

Effect-Site Target-Controlled Infusion in the Obese: Model Derivation and Performance Assessment

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本研究的目的是設計異丙酚藥代（PK）藥效（PD）動力學模型，對肥胖患者實施效應室靶控輸注（TCI），並分析其與其他可用的 PK 模型性能的差別。研究的第一步，用一階速率常數（keo）與反曲抑制性 Emax PD 模型相連的三室 PK 模型擬合異丙酚濃度-雙譜指數（BIS）資料。用 NOMEM(ICON, Dublin, Ireland)中非線性混合效應回歸進行群體建模分析。收集來自之前針對肥胖成年患者的 3 個研究（n=47）的 PK 資料，包括其中一項研究（n=20）的 PD（BIS）資料，匯總並同時進行分析。NONMEM 目標函數（ΔOBJ）下降 3.84 點，作為附加參數，在 0.05 水準被認為有顯著性意義。研究的第二步，我們使用獨立資料集（n=14）分析了當前模型和其他可用模型的預測性能（中位數預測誤差[MDPE]和中值絕對預測誤差[MDAPE]）。步驟 1：所選擇的 PK、PD 模型產生了足夠的資料擬合。總體重得出體積和清除的最佳規格梯度(ΔOBJ, -18.173)。經驗性異速生長的總體重關係並沒有改善模型的契合度(ΔOBJ, 0.309)。BIS 回應的滯後時間參數改善了這個契合度(ΔOBJ, 89.593)。沒有觀察到年齡或性別的影響。步驟 2：當前模型的

MDPE 和 MDAPE 在 PK 部分分別為 11.5%（3.7-25.0）和 26.8%（20.7-32.6），PD 部分中分別為 0.4%（-10.39 到 3.85）和 11.9%（20.7-32.6）。Eleveld 等人建立的 PK 模型產生了最小的 PK 預測誤差(MDPE = <10% 和 MDAPE = <25%)。我們推導並驗證了一種異丙酚 PKPKD 模型在肥胖患者中的效應室靶控輸注。僅從肥胖患者的資料中得出結論：因為存在劑量不足的風險，這個模型不推薦用於消瘦患者的 TCI。

（魏蘭譯 李士通校）

The aim of this study is to derive a propofol pharmacokinetic (PK) pharmacodynamic (PD) model to perform effect-site target-controlled infusion (TCI) in obese patients, and to analyze its performance along with that of other available PK models. In the first step of the study, a 3-compartment PK model linked to a sigmoidal inhibitory Emax PD model by a first-order rate constant (keo) was used to fit propofol concentration-bispectral index (BIS) data. Population modeling analysis was performed by nonlinear mixed effects regression in NONMEM (ICON, Dublin, Ireland). PK data from 3 previous studies in obese adult patients (n = 47), including PD (BIS) data from 1 of these studies (n = 20), were pooled and simultaneously analyzed. A decrease in NONMEM objective function (ΔOBJ) of 3.84 points, for an added parameter, was considered significant at the 0.05 level. In the second step of the study, we analyzed the predictive performance (median predictive errors [MDPE] and median absolute predictive errors [MDAPE]) of the current model and of other available models using an independent data set (n = 14). Step 1: The selected PKPD model produced an adequate fit of the data. Total body weight resulted in the best size scalar for volumes and clearances (ΔOBJ, -18.173). Empirical allometric total body weight relationships did not improve model fit (ΔOBJ, 0.309). A lag time parameter for BIS response improved the fit (ΔOBJ, 89.593). No effect of age or gender was observed. Step 2: Current model MDPE and MDAPE were 11.5% (3.7-25.0) and 26.8% (20.7-32.6) in the PK part and 0.4% (-10.39 to 3.85) and 11.9% (20.7-32.6) in the PD part. The PK model developed by Eleveld et al resulted in the lowest PK predictive errors (MDPE = <10% and MDAPE = <25%).We derived and validated a propofol PKPD model to perform effect-site TCI in obese patients. This model, derived exclusively from obese patient's data, is not recommended for TCI in lean patients because it carries the risk of underdosing.

丙泊酚用於患者自控鎮靜與醫師使用鎮靜效果對比：通過序貫試驗分析進行系統回顧和 Meta 分析

Patient-Controlled Versus Clinician-Controlled Sedation With Propofol: Systematic Review and Meta-analysis With Trial Sequential Analyses

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使用丙泊酚鎮靜經常被用於診斷和治療過程的順利進行。丙泊酚可以通過患者自控（patient-controlled sedation，PCS）或者臨床醫生使用（clinician-controlled sedation，CCS）。我們的目的是比較此兩種技術的不同。搜索了截至於 2017 年 10 月在 PubMed、Embase、CENTRAL 以及註冊實驗的，對比使用丙泊酚的 PCS 和 CCS 的隨機對照研究。主要觀察指標是至少出現 1 次氧飽和度降低、動脈血壓降低、心動過緩以及需要針對鎮靜相關不良事件進行急救干預（包括藥物治療或物理治療）的風險。次要觀察指標為丙泊酚的注射劑量，操作者和患者的滿意度以及存在過度鎮靜的風險。始終使用隨機效應模型和調整顯著性水準 α 到 0.02 用於多重分析。對主要結果進行試驗序貫分析。根據證據治療評價系統對證據品質進行評估。13 個試驗（包含 1103 名患者；年齡中位數 47 歲；ASA I-III 級）在不同的診斷和治療過程中使用丙泊酚鎮靜被納入本研究中。PCS 對氧飽和度降低的風險沒有影響（包含 11 個試驗，PCS 組 31/448 名患者[6.9%]vs. CCS 組 46/481 名患者 [9.6%]；風險比 0.74 [98%可信區間為 0.35-1.56]），但是 PCS 降低了需要針對鎮靜相關的不良事件進行救援干預的風險（包含 11 個試驗，PCS 組 29/449 名患者[6.5%]vs. CCS 組 74/482 名患者 [15.4%]；風險比 0.45 [98%可信區間為 0.25-0.81]）。對所有的結果進行試驗序貫分析發現進一步試驗不太可能改變結果，儘管主要觀察指標的證據品質都很低。由於樣本數量不夠無法得出確定性的結論，因此沒有針對動脈血壓降低和心動過緩進行評價。對次要觀察指標進行分析發現 PCS 降低了過度鎮靜的風險，並且其對丙泊酚輸注劑量和操作者或患者的滿意度

沒有影響。與使用丙泊酚進行 CCS 相比，使用丙泊酚進行 PCS 對氧飽和度降低的風險沒有影響，但是其能顯著性地降低需要針對鎮靜相關的不良事件進行救援干預的風險。未來需要進一步高品質的試驗來評估 PCS 的風險和收益。

（黃勇譯 李士通校）

Sedation with propofol is frequently used to facilitate diagnostic and therapeutic procedures. Propofol can be administrated by the patient (patient-controlled sedation [PCS]) or by a clinician (clinician-controlled sedation [CCS]). We aimed to compare these 2 techniques. PubMed, Embase, CENTRAL, and trial registries were searched up to October 2017 for randomized controlled trials comparing PCS with CCS with propofol. The primary end points were the risks of presenting at least 1 episode of oxygen desaturation, arterial hypotension, and bradycardia, and the risk of requiring a rescue intervention (pharmacologic therapies or physical maneuvers) for sedation-related adverse events. Secondary end points were the dose of propofol administrated, operator and patient satisfaction, and the risk of oversedation. A random-effects model and an α level of .02 to adjust for multiple analyses were used throughout. Trial sequential analyses were performed for primary outcomes. Quality of evidence was assessed according to the Grades of Recommendation, Assessment, Development, and Evaluation system. Thirteen trials (1103 patients; median age, 47 years; American Society of Anesthesiologists physical status I-III) describing various diagnostic and therapeutic procedures with propofol sedation were included. PCS had no impact on the risk of oxygen desaturation (11 trials, 31/448 patients [6.9%] with PCS versus 46/481 [9.6%] with CCS; risk ratio, 0.74 [98% confidence interval, 0.35-1.56]) but decreased the risk of requiring a rescue intervention for adverse events (11 trials, 29/449 patients [6.5%] with PCS versus 74/482 [15.4%] with CCS; risk ratio, 0.45 [98% confidence interval, 0.25-0.81]). For both outcomes, Trial sequential analyses suggested that further trials were unlikely to change the results, although the quality of evidence was graded very low for all primary outcomes. For the risk of arterial hypotension and bradycardia, the required sample size for a definitive conclusion had not been reached. Analysis of secondary outcomes suggested that PCS decreased the risk of oversedation and had no impact on propofol dose administrated, or on operator or patient satisfaction.PCS with propofol, compared with CCS with propofol, had no impact on the risk of oxygen desaturation, but significantly decreased the risk of rescue interventions for sedation-related adverse events. Further high-quality trials are required to assess the risks and benefits of PCS.

在氣道管理訓練中，一種新型屍體固定模型（固定生命）和福馬林固定屍體模型以及人體模型之間適用性和實用性的比較

Comparison of a Novel Cadaver Model (Fix for Life) With the Formalin-Fixed

Cadaver and Manikin Model for Suitability and Realism in Airway Management Training

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背景：雖然人體模型廣泛運用於氣道管理的培訓，但是在類比人工氣道的真實感以及病人個體差異方面仍顯不足。我們研究發現：與人體模型（第三代類比人）和福馬林固定屍體相比，利用新型防腐方法（F4L）處理的屍體，用於三種基礎氣道管理（面罩通氣、氣管插管、喉罩置入）教學方面更具適用性及實用性。

方法：30 名麻醉醫生和有經驗的住院醫生(作為操作者)分別在 10 具 F4L 模型、10 具福馬林屍體模型和 1 具類比人模型中實施三項建立氣道管理的方法。每一操作者被隨機分配給任一模型類型。得出如下主要結果：根據教學模型的類型排名（總排名），根據每種技術利用的模型類型和操作者對模型在技能操作的適用性和實用性方面的口頭評價的平均分進行排名。次要結果：根據每種技術在每一模型上成功操作的百分比（完成各自氣道操作的成功率）排名。對於各種氣道技術而言，利用 Friedman 方差分析法比較三種模型操作者的平均等級以及其口頭評價平均分。

結果： 30 名中有 27 名操作者（90%）完成了在所有可用模型上建立所有氣道技術，而其餘 3 名操作者完成大部分的操作但因某種原因未能完成所有氣道操作。對於不同模型每種技術操作的嘗試次數總計不同，人體模型 30 次，F4L 模型 292 次，福馬林固定屍體模型 282 次。作為操作模型，每種類型的模型操作者的等級中位數分別是：:F4L 為 1，人體模型為 2，福馬林固定屍體為 3 ($P < .001$) 。所以，F4L 被認為是面罩通氣最佳模型($P = .029$)並且在喉罩置入的實用性上具有較高的口頭評價分數($P = .043$)。 F4L 和人體模型在適用性和實用性方面的分數沒

有顯著差異。福馬林固定屍體模型在所有操作過程中被評為最低等級和最低分數 。操作成功率最高的是人體模型。

總結：F4L 模型在面罩通氣方面排名最高，並被認為是訓練喉罩置入最具真實性的模型。而福馬林固定屍體模型不適合進行氣道管理訓練。

（肖蘊譽譯 李士通校）

BACKGROUND: Manikins are widely used in airway management training; however, simulation of realism and interpatient variability remains a challenge. We investigated whether cadavers embalmed with the novel Fix for Life (F4L) embalmment method are a suitable and realistic model for teaching 3 basic airway skills: facemask ventilation, tracheal intubation, and laryngeal mask insertion compared to a manikin (SimMan 3G) and formalin-fixed cadavers.
METHODS: Thirty anesthesiologists and experienced residents ("operators") were instructed to perform the 3 airway techniques in 10 F4L, 10 formalin-fixed cadavers, and 1 manikin. The order of the model type was randomized per operator. Primary outcomes were the operators' ranking of each model type as a teaching model (total rank), ranking of the model types per technique, and an operator's average verbal rating score for suitability and realism of learning the technique on the model. Secondary outcomes were the percentages of successfully performed procedures per technique and per model (success rates in completing the respective airway maneuvers). For each of the airway techniques, the Friedman analysis of variance was used to compare the 3 models on mean operator ranking and mean verbal rating scores.
RESULTS: Twenty-seven of 30 operators (90%) performed all airway techniques on all of the available models, whereas 3 operators performed the majority but not all of the airway maneuvers on all models for logistical reasons. The total number of attempts for each technique was 30 on the manikin, 292 in the F4L, and 282 on the formalin-fixed cadavers. The operators' median total ranking of each model type as a teaching model was 1 for F4L, 2 for the manikin and, 3 for the formalin-fixed cadavers ($P < .001$). F4L was considered the best model for mask ventilation ($P = .029$) and had a higher mean verbal rating score for realism in laryngeal mask airway insertion ($P = .043$). The F4L and manikin did not differ significantly in other scores for suitability and realism. The formalin-fixed cadaver was ranked last and received lowest scores in all procedures (all $P < .001$). Success rates of the procedures were highest in the manikin.
CONCLUSIONS: F4L cadavers were ranked highest for mask ventilation and were considered the most realistic model for training laryngeal mask insertion.
Formalin-fixed cadavers are inappropriate for airway management training.

喉罩與其他氣道裝置用於上呼吸道感染患兒麻醉的比較：呼吸系統併發症的系統

回顧和Meta分析

Laryngeal Mask Airway Versus Other Airway Devices for Anesthesia in Children With an Upper Respiratory Tract Infection: A Systematic Review and Meta-analysis of Respiratory Complications

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上呼吸道感染（URTI）與圍手術期呼吸道不良事件（PRAE）發生率增加有關，這是小兒麻醉過程中的主要危險因素。本研究的目的是比較不同氣道裝置用於上呼吸道感染患兒麻醉期間發生圍手術期呼吸道不良事件的風險。根據 Cochrane 手冊和 Meta 分析指南的優先報告專案進行了系統性評價並制定出 Meta 分析指南。只有隨機臨床試驗評估了包括使用任何氣道裝置的上呼吸道感染患兒的麻醉情況。從確定的 1030 項研究中，最終有 5 項隨機臨床試驗納入分析。喉罩氣道（LMA®）和氣管導管（ETT）之間在保持呼吸屏氣或窒息（風險比[RR]為 0.82; 95％置信區間[CI]為 0.41-1.65），喉痙攣（RR 為 0.74; 95％CI 為 0.18-2.95）和動脈氧飽和度降低（RR，0.44; 95％CI，0.16-1.17）沒有統計學差異。第一個結果的證據品質較低，另外兩個結果的證據品質更低。與氣管導管相比，使用 LMA 可以顯著降低咳嗽（RR 為 0.75; 95％CI 為 0.58-0.96，證據品質低）的發生。由於麻醉期間圍手術期呼吸系統併發症的資料過少，導致上呼吸道感染患兒的理想氣道管理方式仍不明確。該系統回顧表明，上呼吸道感染患兒麻醉期間使用 LMA 並未減少最令人擔心的圍手術期呼吸道不良事件的發生。然而，在減少咳嗽方面 LMA 優於 ETT。需要進一步研究以更明確地定義風險，因為咳嗽和喉痙攣存在相似的觸發因素，支氣管痙攣和喉痙攣均可引起咳嗽。

（唐佳雯譯 李士通校）

There is an association between upper respiratory tract infection (URTI) and an increased incidence of perioperative respiratory adverse events (PRAEs), which is a major risk for morbidity during pediatric anesthesia. The aim of the present study was to compare the risk of PRAEs among different airway devices during anesthesia in children with a URTI. A systematic review according to the Cochrane Handbook and Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines was conducted. Only randomized clinical trials evaluating anesthesia in children with a URTI and who were submitted to any of the airway devices were included. From 1030 studies identified, 5 randomized clinical trials were included in the final analysis. There were no statistical differences between laryngeal mask airway (LMA®) and endotracheal tube (ETT) regarding breath holding or apnea (risk ratio [RR], 0.82; 95% confidence interval [CI], 0.41-1.65), laryngospasm (RR, 0.74; 95% CI, 0.18-2.95), and arterial oxygen desaturation (RR, 0.44; 95% CI, 0.16-1.17). The quality of evidence was low for the first outcome and very low for the 2 other outcomes, respectively. The LMA use produced a significant reduction of cough (RR, 0.75; 95% CI, 0.58-0.96, low quality of evidence) compared with ETT. The ideal airway management in children with a URTI remains obscure given that there are few data of perioperative respiratory complications during anesthesia. This systematic review demonstrates that LMA use during anesthesia in children with URTI did not result in decrease of the most feared PRAEs. However, LMA was better than ETT in reducing cough. Further research is needed to define the risks more clearly because cough and laryngospasm have similar triggers, and both bronchospasm and laryngospasm trigger cough.