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*Anesth Analg April 2010 110:1239;*

# 兒童心肺轉流術後血栓彈性描記法、止血變數和出血之間的關聯

**The Relationship Among Thromboelastography, Hemostatic Variables, and Bleeding After Cardiopulmonary Bypass Surgery in Children**

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Anesth Analg 2010; 110: 995-1002

**背景：**縱膈出血在兒童心肺轉流術(CPB)後很常見。血栓彈性描記法(TEG®)可以預測出血並提供對可能機制的洞察。我們的目的是：（a）比較有明顯出血（出血組）和沒有明顯出血（對照組）患者圍手術期 TEG®的暫時檔案資料和實驗室止血變數；（b）研究 TEG®變數和常規止血變數之間的關係；（c）建立一個預測出血的模型。
**方法：**50 名體重<20 kg，行 CPB 手術的兒童，前瞻性地在 8 個預定義的時間測定 TEG®和實驗室止血變數。
**結果：**出血患者的 TEG®資料不同於未明顯出血的患者。這在魚精蛋白給藥後最明顯，部分可歸因於肝素逆轉的不充分，但也和出血組的纖維蛋白原均數的最低值（標準差）較對照組明顯降低有關：分別是 0.44（0.18）和 0.71（0.40）g/L,(P = 0.01)。我們發現大多數 TEG®和實驗室止血變數之間存在顯著的非線性關係。關聯最密切的是最大波幅和血小板—纖維蛋白原乘積(對數 r2 = 0.71)。當（a）纖維蛋白原濃度<1 g/L、（b）血小板<120 × $10^9$/L 及（c）血小板—纖維蛋白原乘積<100 時，血凝塊強度迅速減小。一個包括麻醉誘導時啟動部分促凝血酶原激酶時間和魚精蛋白給藥後 TEG®平均波幅的雙變數模型可以很好地鑒別後來的出血（C 統計值 0.859）。
**結論：**低纖維蛋白原血症和肝素逆轉的不充分是促成兒科 CPB 後凝血塊強度和圍術期出血的兩個重要因素。TEG®可能是一個預測和指導該組患者縱膈出血早期治療的有用工具。
（唐李雋 譯 馬皓琳、李士通 校）

**BACKGROUND:** Mediastinal bleeding is common after pediatric cardiopulmonary bypass (CPB) surgery. Thromboelastography (TEG®) may predict bleeding and provide insight into likely mechanisms. We aimed to (a) compare perioperative temporal profiles of TEG® and laboratory hemostatic variables between patients with significant hemorrhage (BLEED) and those without (CONTROL), (b) investigate the relationship between TEG® variables and routine hemostatic variables, and (c) develop a model for prediction of bleeding.

**METHODS:** TEG® and laboratory hemostatic variables were measured prospectively at 8 predefined times for 50 children weighing <20 kg undergoing CPB.
**RESULTS:** Patients who bled demonstrated different TEG® profiles than those who did not. This was most apparent after protamine administration and was partly attributable to inadequate heparin reversal, but was also associated with a significantly lower nadir in mean (SD) fibrinogen for the BLEED group compared with CONTROL group: 0.44 (0.18) and 0.71 (0.40) g/L, respectively (P = 0.01). Significant nonlinear relationships were found between the majority of TEG® and laboratory hemostatic variables. The strongest relationship was between the maximal amplitude and the platelet-fibrinogen product (logarithmic $r^2$ = 0.71). Clot strength decreased rapidly when (a) fibrinogen concentration was <1 g/L, (b) platelets were <120 × $10^9$/L, and (c) platelet-fibrinogen product was <100. A 2-variable model including the activated partial thromboplastin time at induction of anesthesia and TEG® mean amplitude postprotamine discriminated well for subsequent bleeding (C statistic 0.859).
**CONCLUSIONS:** Hypofibrinogenemia and inadequate heparin reversal are 2 important factors contributing to clot strength and perioperative hemorrhage after pediatric CPB. TEG® may be a useful tool for predicting and guiding early treatment of mediastinal bleeding in this group.

## 乳化異氟醚對離體蟾蜍坐骨神經的可逆性神經傳導阻滯

**Reversible Conduction Block in Isolated Toad Sciatic Nerve by Emulsified Isoflurane**

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背景：已經有研究表明局部應用揮發性麻醉藥可以起到局部麻醉劑的作用，我們設計本實驗來評估乳化異氟醚(EI)的神經傳導阻滯的特性，同時通過測量離體蟾蜍坐骨神經的複合神經動作電位(CNAP)參數來比較乳化異氟醚和 1%利多卡因的神經阻滯作用。
方法：選擇 100 條分離出來的蟾蜍坐骨神經，隨機分成 10 組(每組 10 條)，分別給予濃度 2%到 8%的乳化異氟醚(共 8 組)、1%利多卡因、30%英脫利匹特®（中國江蘇無錫華瑞製藥）和林格式液（RS）十分鐘。然後用 RS 清洗所有神經 10 分鐘，浸泡 30 分鐘。神經傳導阻滯的效果通過細胞外記錄儀每分鐘記錄的 CNAP 參數表示。
結果：結果表明 CNAP 負極的振幅在 EI 和利多卡因組減少(P<0.05)，在某些時點(D7－W3)CNAP 的傳導速度同樣減慢(P<0.05)。在林格式液沖洗後 2 個參數逐漸恢復。EI 引起的 2 個參數的變化比利多卡因引起的起效速度慢(7 分鐘比 1 分鐘)，恢復更快 (9 分鐘比 30 分鐘)。EI 引起的神經阻滯效應呈劑量依賴性(P<0.05)，EI 的半數最大抑制濃度是 5.46%。

結論：EI 可以引起完全可逆的劑量依賴性的神經傳導阻滯，和利多卡因引起的神經傳導阻滯相比，起效慢恢復快。
（薑旭暉譯，馬皓琳，李士通校）

**BACKGROUND:** Studies have shown that the local use of volatile anesthetics can produce local anesthetic effects. We designed this study to evaluate the characteristics of nerve conduction block of emulsified isoflurane (EI) and compare its nerve blockade with 1%lidocaine, by measuring compound nerve action potential (CNAP) parameters in isolated toad sciatic nerve.
**METHODS:** One hundred isolated toad sciatic nerves were selected and randomly assigned to 10 groups of 10 each, administered 2% to 8% EI (v/v) ($EI_8$ group, etc.), 1% lidocaine, 30% Intralipid® (Huarui Pharmacy, Wuxi, Jiangsu, China), and Ringer solution (RS) for 10 minutes, respectively. All nerves were then washed and soaked with RS for 10 minutes and 30 minutes. The nerve conduction block effect was represented by CNAP parameters that were recorded by an extracellular recording technique per minute.
**RESULTS:** The results showed that the negative amplitudes of CNAP were decreased by EI and lidocaine ($P < 0.05$), and the conduction velocities of CNAP were also decreased at some time points (D7–W3) ($P < 0.05$). After RS washing, the 2 parameters recovered gradually. The changes in the 2 parameters induced by EI had slower onset rates and faster recoveries than those produced by lidocaine (7 minutes vs 1 minute and 9 minutes vs 30 minutes). The nerve blockade induced by EI was dose dependent ($P < 0.05$), and the half maximal inhibition concentration of EI was 5.46%.
**CONCLUSIONS:** EI produced completely reversible and dose-dependent nerve conduction inhibition, which had slower onset and faster recovery compared with those produced by lidocaine.

## 一個手術部位感染群：一個調查的過程和結果——酒精類手術消毒產品和人為行動的影響

**A Surgical Site Infection Cluster: The Process and Outcome of an Investigation—The Impact of an Alcohol-Based Surgical Antisepsis Product and Human Behavior**

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**背景：**用於成功執行圍術期抗生素管理系統的一個程式的制定，只是防止術後感染的一個部分。感染的連續監測是減少術後感染程式的一個重要部分。最近，我們發現術後感染患者的人數增加。我們運用標準的控制感染爆發的調查方法，跟蹤多項變數從而找到一個共同的原因。我們在此記述品質改進方法運用於調查和管理外科手術部位感染（SSI）集合所通過的程式。

方法：作為 SSI 常規監測的一部分，感染控制部門找出術後感染的證據。根據國家醫療安全網路 SSI 標準定義患者是否為 SSI。每月回顧 SSI 資料並且按季度總計。SSI 率在 2007 年已連續三個季度高於我們的一般水準。這一感染率的上升導致了這一國內爆發性調查研究，稱作為“集群調研”。這項調查研究包含了多元化協作的方法，包括所用患者的病歷人工回顧、微生物學資料的回顧、以及手術室、儀器處理設備和儲存區的檢查。

**結果：**在三個季度期間，證實了普外科中四種手術方式的 SSI 持續增多並形成一種趨勢。建立的抗生素治療方案適用於大部分的這些 SSI 的預防。作為此項研究的一部分，還進行了對手部衛生以及手術人員手部抗菌技術的直接觀察。與此同時，有兩種外科手部消毒劑被採用，由臨床醫生自由選擇：用抗菌肥皂洗刷或者應用葡萄糖酸洗必泰以及含酒精成分的外科手部抗菌產品。觀察者注意到了這種含酒精的外科手部抗菌液的使用並不合適。這一產品已從手術室撤出，並且 SSI 率在接下來的兩個季度中明顯下降。

討論：最後，我們報告了調查三個季度 SSI 率增高的品質改進程式的結果。我們進行了一項調查研究，且認為錯誤的使用含酒精的抗菌產品使感染率增長。除去這一產品，連同重新強調控制感染的重要性一起，使感染率下降至平於或者低於我們的歷史水準。

（龔寅 譯 馬皓琳 李士通校）

**BACKGROUND:** The institution of a process used to successfully execute a perioperative antibiotic administration system is but 1 component of preventing postoperative infections. Continued surveillance of infections is an important part of the process of decreasing postoperative infections. We recently experienced an increase in the number of postoperative infections in our patients. Using standard infection control methods of outbreak investigation, we tracked multiple variables to search for a common cause. We describe herein the process by which Quality Improvement methodology was used to investigate and manage this surgical site infection (SSI) cluster.

**METHODS:** As part of routine surveillance for SSI, the infection control division seeks out evidence of postoperative infections. Patients were defined as having an SSI according to National Healthcare Safety Network SSI criteria. SSI data are reviewed monthly and aggregated on a quarterly basis. The SSI rate was above our usual level for 3 consecutive quarters of 2007. This increase in the infection rate led to an internal outbreak investigation, termed a “cluster investigation.” This investigation comprised multiple concurrent methods including manual chart review of all cases; review of microbiological data; and inspection of operating rooms, instrument processing facilities, and storage areas.

**RESULTS:** During 3 quarters, a trend emerged in our general surgical population that demonstrated that 4 surgical types had a sustained increase in SSI. The institutional antibiotic protocol was appropriate for prevention of the majority of these SSIs. As part of the investigation, direct observation of hand hygiene and surgical hand antisepsis technique was undertaken. At this time, there were 2 types of surgical hand preparation being used, at the discretion of the clinician: either a “standard” scrub with an antimicrobial soap or the application of a chlorhexidine gluconate and alcohol-based

surgical hand antisepsis product. Observers noted improper use of this alcohol-based surgical hand antiseptic. This product was withdrawn from our operating rooms, and the SSI rate markedly decreased in the following 2 quarters.

**DISCUSSION:** In conclusion, we report the results of a quality improvement process that investigated a 3-quarter increase in our SSI rate. An investigation was undertaken, and it was thought that the (mis)use of an alcohol-based hand antiseptic product was associated with the increased infection rate. Removing this product, along with reemphasizing the importance of infection control, was associated with a decrease in the infection rate to a level at or below our historical rate.

## 內臟神經阻滯對不耐受腸內營養的危重病人的影響：一項隨機、安慰劑對照研究

**The Effect of Celiac Plexus Block in Critically Ill Patients Intolerant of Enteral Nutrition: A Randomized, Placebo-Controlled Study**

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**背景：**在本項研究中，我們評估了在危重病人中，內臟神經阻滯對腸內營養不耐受症的治療效果。

**方法：**19 例機械通氣後有腸內營養不耐受症且正服用胃複安的病人接受了雙側內臟神經阻滯。前路在超聲引導下完成，分別注射 0.25%布比卡因 25ml（實驗組，n=10）和生理鹽水（對照組，n=9）。用撲熱息痛吸收法測定胃排空。神經阻滯之後，開始鼻飼營養，並且每 24 小時抽吸一次鼻胃管。我們將鼻飼速度≥40 mL/h 時，每 24 小時胃潴留量<250 mL 定義為成功的腸內營養。

**結果：**兩組病人的一般情況資料無顯著差異。實驗組血漿撲熱息痛吸收曲線下面積(383.8 ± 248.1 mg • min • $L^{-1}$)和血漿撲熱息痛濃度峰值($C_{max}$; 3.28 ± 2.15 mg/L)較對照組（1233.5 ± 771.2 和 $C_{max}$10.14 ± 6.04）均明顯降低（均為 P < 0.001）。經過內臟神經阻滯治療後，平均胃潴留量降低（實驗組: 430 ± 32 mL 降至 205 ± 30 mL, P < 0.001; 對照組: 450 ± 33 mL 變為 461 ± 19 mL, P > 0.05），且腸內營養的成功率提高（實驗組 80%對比對照組 0%, P < 0.001）。

**結論：**對於危重病人，當靜脈藥物治療無法改善胃腸功能紊亂時，內臟神經阻滯對腸內營養不耐受症的治療是有效的。

（劉伍翻譯，馬皓琳、李士通校正）

**BACKGROUND:** In this study, we evaluated the efficacy of celiac plexus block for the treatment of feeding intolerance in critically ill patients.

**METHODS:** Nineteen mechanically ventilated medical patients intolerant of enteral nutrition and receiving metoclopramide underwent bilateral celiac plexus block. The anterior procedure was accomplished under sonographic guidance with the injection of either 25 mL bupivacaine 0.25% (celiac group, n = 10) or saline (control group, n = 9)

bilaterally. Gastric emptying was assessed by the acetaminophen absorption method. After the block, nasogastric feeding was commenced, and nasogastric aspirates were collected once every 24 hours. Successful feeding was defined as 24-hourly gastric residual volume <250 mL with a feeding rate ≥40 mL/h.

**RESULTS:** Demographic data were similar for the 2 groups. The area under the plasma paracetamol absorption curve (383.8 ± 248.1 mg · min · $L^{-1}$) and the peak plasma paracetamol concentration ($C_{max}$; 3.28 ± 2.15 mg/L) in the celiac group were significantly lower than the area under the curve value (1233.5 ± 771.2) and $C_{max}$ value (10.14 ± 6.04) in controls ($P < 0.001$ for all). After treatment, celiac plexus block reduced the mean gastric residual volume (celiac group: 430 ± 32 mL to 205 ± 30 mL, $P < 0.001$; control group: 450 ± 33 mL to 461 ± 19 mL, $P > 0.05$) and improved the proportion of patients with successful feeding (celiac block 80% vs controls 0%, $P < 0.001$).

**CONCLUSION:** In critical illness, celiac plexus block is effective for treating feeding intolerance when IV drug therapy has failed to improve gastrointestinal dysfunction.

## 雙親出現在麻醉後監護室對小兒術後行為的影響：一項前瞻性隨機對照試驗

**The Effects of Parental Presence in the Postanesthetic Care Unit on Children's Postoperative Behavior: A Prospective, Randomized, Controlled Study**

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**背景：**很少人研究過雙親出現在麻醉後監護室（PACU）對小兒術後行為的影響，而很少的出版的研究也都是回顧性的、非隨機性或無合適的對照。他們的結果顯示，雙親在麻醉後監護室可以減少小兒術後哭吵和消極行為改變。我們進行了這項前瞻性隨機對照試驗，來證明父母在麻醉後監護室是否能影響小兒在 PACU 的哭吵和術後兩周的行為改變。

**方法：**隨機選擇年齡在 2 至 8 歲 11 個月，ASA I 至 II 級，擇期門診手術，預計在麻醉後監護室逗留超過 10 分鐘的患者，隨機分為雙親在 PACU（n = 150）或不在 PACU（n = 150）組。所有的父母都作了相同的準備程式，雙親在場組的患兒術後睜開眼就可以看到父母。在麻醉後監護室，依據 5 分評分法從患者睜眼開始每分鐘對其哭吵程度進行評分；用出院後行為調查問卷對其出院後兩周的消極行為改變進行評估。由於沒有預先確定麻醉方式，因此收集麻醉中的一些資料，確保兩組的相似性。運用多因素邏輯回歸分析來確定麻醉後監護室中的哭吵和術後兩周行為改變的預計因素。

結果：麻醉後監護室雙親在場並沒有減少術後小兒的哭吵，而雙親不在場的患者術後兩周消極行為改變的發生率較雙親在場的要高（45.8%比 29.3%; P = 0.007），

多因素回歸分析證明，以下因素對預計患兒在麻醉後監護室中哭吵時間的有重要作用(R2 = 0.256, F[5, 273] = 15.66, P < 0.001)：年齡小於 5 歲（P < 0.001），手術當日到達後 15 分鐘東安大略兒童醫院疼痛評分較高者(P < 0.001)。雙親是否在 PACU、社會經濟地位、術中阿片類鎮痛藥並不影響患兒在麻醉後監護室的哭吵。邏輯回歸分析證明，以下因素(x2[4] = 26.62, P < 0.001)可以預計術後兩周消極行為改變的發生：年齡小於 5 歲(P < 0.001)，雙親不在場組患兒(P = 0.003)。

**結論**：對於行門診手術的健康小兒，麻醉後監護室雙親在場能夠減少術後兩周消極行為改變，但對麻醉後監護室的哭吵行為並沒有影響。對術後行為改變的進一步研究必須考慮麻醉後監護室雙親陪同這個因素，以及有其它因素幹擾時，其作用是否能持續。

（徐妍君 譯　馬皓琳 李士通 校）

**BACKGROUND:** The effects on children of parental presence in the postanesthesia care unit (PACU) have not been extensively studied. The few published studies are retrospective, nonrandomized, or lack adequate controls. They suggest that parental presence in the PACU decreases crying and negative behavior change postoperatively. We performed this prospective, randomized, controlled study to determine whether the presence of a parent affected crying behaviors in the PACU and behavior change 2 weeks postoperatively.

**METHODS:** Randomly selected patients, aged 2.0 to 8 years 11 months, ASA physical status I or II, and scheduled for elective outpatient surgery with an anticipated PACU stay of >10 minutes were randomly assigned to the parent present group (n = 150) or parent absent group (n = 150) in the PACU. All parents underwent the same preparation program. Reunification occurred once children's eyes had opened for the parent present group. In the PACU, crying was scored each minute after eye opening using a 5-point scale. Negative behavior change 2 weeks after discharge was determined using the Post Hospitalization Behavior Questionnaire. Because the anesthesia technique to be used was not determined a priori, data on the technique used were collected to ensure that groups were similar. Multiple and logistic regression techniques were used to determine predictors of crying in the PACU and behavior change 2 weeks postoperatively.

**RESULTS:** Parental presence in the PACU made no difference in crying in the PACU. Negative behavior change 2 weeks postoperatively occurred more frequently in the parent absent group than the parent present group (45.8% vs 29.3%; P = 0.007). Multiple regression identified the following significant factors as predictive of larger proportion of time spent crying in the PACU ($R^2$ = 0.256, F[5, 273] = 15.66, P < 0.001): age <5 years (P < 0.001) and higher Children's Hospital of Eastern Ontario Pain Scale score at 15 minutes after arrival in day surgery (P < 0.001). Parental presence or absence from the PACU was not predictive of crying in the PACU, and neither were socioeconomic status nor intraoperative opioid analgesia. Logistic regression identified the following factors ($\chi^2$[4] = 26.62, P < 0.001) as predictive of negative behavior change at 2 weeks postoperatively: being younger than 5 years (P < 0.001) and being in the parent absent group (P = 0.003).

**CONCLUSION:** For fit healthy children undergoing outpatient surgery, parental presence in the PACU decreases negative behavior change at 2 weeks postoperatively but makes no difference in crying in the PACU. Future studies of behavior change postoperatively should consider parental presence in the PACU a factor and determine whether the effect persists with other interventions.

## 兒科心臟麻醉培訓計畫

**A Proposal for Training in Pediatric Cardiac Anesthesia**

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儘管有相對普遍的可適用知識庫和操作規範，但是兒科心臟麻醉培訓和經驗在目前的系統基礎麻醉和成人心胸麻醉項目中是有限的和缺乏統一規範的。兒科麻醉培訓中的經驗雖然是統一可利用的，但是有時間的局限性和強度的多樣性。所以先天性心臟麻醉協會的一個工作組提出了一個方案用於培訓兒科心臟麻醉，且國際兒科心臟麻醉學者必須認為這是一個有必要改良的範本。
（胡豔譯　馬皓琳 李士通校）

Despite a relatively universally applicable knowledge base and skill set, training and experience in pediatric cardiac anesthesia in currently organized basic anesthesia and Adult Cardiothoracic Anesthesia fellowship programs are very limited and not uniformly available. Experience during Pediatric Anesthesia fellowship training is uniformly available but of limited duration and varying intensity. We present a schema, developed by a working group of the Congenital Cardiac Anesthesia Society, for training in pediatric cardiac anesthesia that pediatric cardiac anesthesia educators internationally should consider as a template to be modified as necessary.

## 進行深部腦刺激器插入的患者的麻醉管理

**Anesthetic Management of Patients Undergoing Deep Brain Stimulator Insertion**

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Anesth Analg 2010; 110:1138-1145;

深部腦刺激器用於治療有功能性改變（如運動障礙、其他慢性疾病）的神經系統疾病患者。深部腦刺激器（DBS）的插入是個微創侵入的過程，包括將電極放置入深部的腦結構用以微電極記錄和術中臨床測試以及將 DBS 連接至一個植入起搏器。麻

醉技術隨著每個機構的傳統和需要而不同，並且已包括了有局部麻醉的監測麻醉、清醒鎮靜、全身麻醉。對麻醉醫生來說，監護這些病人面臨的挑戰和要求與功能性神經疾病的病人的特殊關注點、麻醉藥對微電極記錄的影響和手術操作的要求（常包括要求病人清醒且合作）有關。這篇綜述的目的是通過討論機制、麻醉藥影響和 DBS 插入的手術操作，以及功能性神經疾病病人的圍手術期評估、準備、術中麻醉管理和併發症，從而使麻醉醫生熟悉 DBS。
（滕淩雅 譯 馬皓琳 李士通校）

Deep brain stimulation is used for the treatment of patients with neurologic disorders who have an alteration of function, such as movement disorders and other chronic illnesses. The insertion of the deep brain stimulator (DBS) is a minimally invasive procedure that includes the placement of electrodes into deep brain structures for microelectrode recordings and intraoperative clinical testing and connection of the DBS to an implanted pacemaker. The anesthetic technique varies depending on the traditions and requirements of each institution performing these procedures and has included monitored anesthesia with local anesthesia, conscious sedation, and general anesthesia. The challenges and demands for the anesthesiologist in the care of these patients relate to the specific concerns of the patients with functional neurologic disorders, the effects of anesthetic drugs on microelectrode recordings, and the requirements of the surgical procedure, which often include an awake and cooperative patient. The purpose of this review is to familiarize anesthesiologists with deep brain stimulation by discussing the mechanism, the effects of anesthetic drugs, and the surgical procedure of DBS insertion, and the perioperative assessment, preparation, intraoperative anesthetic management, and complications in patients with functional neurologic disorders.

## 在使用嗎啡使用量作為終點的急性疼痛試驗中，年齡對樣本量計算的影響

**The Influence of Age on Sample Size Calculation in Acute Pain Trials Using Morphine Consumption as an End Point**

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Anesth Analg 2010; 110:1186-1190

**背景：**很多急性術後痛的試驗把嗎啡使用量作為研究終點。雖然已證實年齡對嗎啡使用量有明顯的影響，但是在終點分析時，很少被考慮。
**方法：**使用模型觀察年齡對不同樣本量發現對照組和研究組嗎啡使用量差異的把握度的影響。
**結果：**在未校正年齡情況下，使用 t 檢驗比較嗎啡使用量時，達到 80%把握度所需的樣本量大約是樣本量程式預測值的兩倍。
**結論：**此模型表明年齡的變異對樣本量有明顯的影響。研究者或許需要考慮到這一點，從而避免一類誤差和二類誤差的發生。
（王海濤譯 馬皓琳 李士通校）

**BACKGROUND:** Many trials in acute postoperative pain use morphine consumption as an end point. Age has been shown to have a significant influence on morphine consumption but is rarely considered in end point analysis.
**METHODS:** Simulation was used to investigate the effect of age on the power of various sample sizes to detect differences in morphine consumption in control and study groups.
**RESULTS:** The sample sizes required for 80% power were approximately twice that predicted by a sample size program when comparing morphine consumption using a t test without adjustment for age.
**CONCLUSIONS:** The model suggests that variations in age have a profound effect on sample size. Researchers may need to account for this to prevent both type 1 and type 2 error.

## 對乙醯氨基酚與奧凱西平對齧齒類動物軀體及內臟疼痛的協同交互作用

**Synergistic Interactions Between Paracetamol and Oxcarbazepine in Somatic and Visceral Pain Models in Rodents**

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**背景**：聯合用藥是疼痛治療的一種有效途徑，它可以用較少量的鎮痛藥達到最佳鎮痛效果，同時可減少鎮痛藥的副反應。我們建立了一個爪炎症性痛覺過敏的大鼠模型和一個內臟痛的小鼠模型，來檢驗對乙醯氨基酚（一種廣泛使用的非阿片類鎮痛藥）和奧凱西平（一種具有鎮痛作用的比較新的抗驚厥藥）同時用藥的效果，並確定兩者之間相互作用的類型。
**方法**：對乙醯氨基酚、奧凱西平及兩者聯合用藥的效果由角叉藻聚糖(0.1 mL, 1%)誘導的大鼠爪炎症性痛覺過敏模型和醋酸(10 mg/kg, 0.75%)誘導的小鼠扭體試驗模型來檢驗。在這兩個模型中，兩種藥物以 50%有效劑量($ED_{50}$)的固定劑量級分同時給予，而相互作用的類型由等幅射分析法測定。
**結果**：在注射角叉藻聚糖的大鼠模型中，對乙醯氨基酚(口服 50－200 mg/kg)、奧凱西平(口服 40－160 mg/kg )和兩者聯合用藥(單藥 $ED_{50}$的 1/8、1/4、1/3 和 1/2 )均顯示了一個顯著的、劑量依賴性抗痛覺增敏效應。在扭體試驗的小鼠模型中，對乙醯氨基酚(口服 60－180 mg/kg)、奧凱西平(口服 20－80 mg/kg )，和兩者聯合用藥(單藥 $ED_{50}$ 的 1/16、1/8、1/4 和 1/2)均顯著且劑量依賴性的減少了扭體次數。在兩種模型中，等輻射分析法顯示對乙醯氨基酚和奧凱西平有顯著的協同交互作用，與單藥 $ED_{50}$相比聯合用藥可使兩種藥物的使用量均減少超過 1/4。
**結論**：對乙醯氨基酚和奧凱西平的協同交互作用為疼痛治療的聯合用藥提供了新的資訊，並且應該在臨床上作進一步的研究，尤其是患有軀體和/或內臟疼痛的病人。

（周潔 譯　馬皓琳 李士通 校）

**BACKGROUND:** Combination therapy is a valid approach in pain treatment, in which a reduction of doses could reduce side effects and still achieve optimal analgesia. We examined the effects of coadministered paracetamol, a widely used non-opioid analgesic, and oxcarbazepine, a relatively novel anticonvulsant with analgesic properties, in a rat model of paw inflammatory hyperalgesia and in a mice model of visceral pain and determined the type of interaction between components.
**METHODS:** The effects of paracetamol, oxcarbazepine, and their combinations were examined in carrageenan-induced (0.1 mL, 1%) paw inflammatory hyperalgesia in rats and in an acetic acid–induced (10 mg/kg, 0.75%) writhing test in mice. In both models, drugs were coadministered in fixed-dose fractions of the 50% effective dose ($ED_{50}$), and type of interaction was determined by isobolographic analysis.
**RESULTS:** Paracetamol (50–200 mg/kg peroral), oxcarbazepine (40–160 mg/kg peroral), and their combination (1/8, 1/4, 1/3, and 1/2 of a single drug $ED_{50}$) produced a significant, dose-dependent antihyperalgesia in carrageenan-injected rats. In the writhing test in mice, paracetamol (60–180 mg/kg peroral), oxcarbazepine (20–80 mg/kg peroral), and their combination (1/16, 1/8, 1/4, and 1/2 of a single drug $ED_{50}$) significantly and dose dependently reduced the number of writhes. In both models, isobolographic analysis revealed a significant synergistic interaction between paracetamol and oxcarbazepine, with a >4-fold reduction of doses of both drugs in combination, compared with single drugs $ED_{50}$.
**CONCLUSIONS:** The synergistic interaction between paracetamol and oxcarbazepine provides new information about combination pain treatment and should be explored further in patients, especially with somatic and/or visceral pain.

## 對比超聲引導下應用 2 次或 4 次注射技術行腋路臂叢神經阻滯的一項前瞻性、隨機、雙盲對照的研究

**A Prospective, Randomized, Double-Blind Comparison of Ultrasound-Guided Axillary Brachial Plexus Blocks Using 2 Versus 4 Injections**

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**背景：**在該項前瞻性、隨機、雙盲研究中，我們比較了手術期間應用 2 種不同的技術進行腋路臂叢神經阻滯的有效性和時間效能，一種是有 2 個皮膚穿刺點，另一種有 4 個不同的皮膚穿刺點。
**方法：**120 名行上肢手術的患者隨機分入以下兩組：（1）應用 2 次注射方法行腋路臂叢神經阻滯，30mL 局麻藥注射入腋動脈背面（如果需要，變換方向注射，以達到周圍擴散），加 10mL 局麻藥至肌皮神經，上述操作在超聲引導下完成（第 1 組，n=56）；（2）分別注射 4 次，每次 10mL 至正中神經、尺神經、橈神經和肌皮

神經，複合應用超聲技術及神經刺激技術（第 2 組，n=58）。所有病人應用 40mL0.5%的羅呱卡因，並加入 1:400000 的腎上腺素。主要觀察指標為神經阻滯的成功率，以能滿足手術需要定義為成功。次要觀察指標為完成阻滯的時間、運動感覺神經阻滯的起效時間、手術準備就緒的時間以及不良事件的發生率。

**結果：**2 次注射技術完成得稍微快一些（8 比 11 min， P = 0.003）。在 10min、15min、20min、30min 時間點時，4 次注射組的平均阻滯分數稍許較高，而總的阻滯有效的累積百分比在上述時間點並沒有明顯差異，在 2 次注射組為 0.0%、5.4%、12.5%和 37.5%，而在 4 次注射組分別為 6.9%、10.4%、19.0%和 48.3%，P = 0.20。30min 時達到完全阻滯的百分比沒有明顯差異（32.1%比 37.5%，P = 0.55）。最終的阻滯成功率也沒有差異（89.3%比 87.9%， P = 0.99）。

**結論：**超聲引導下的 2 次注射阻滯腋路臂叢神經可能與 4 次注射技術是同樣有效的，同時更有時間有效性。

（黃麗娜 譯 馬皓琳 李士通 校）

**INTRODUCTION:** In this prospective, randomized, double-blind study, we compared the effectiveness and time efficiency of perioperative axillary blocks performed via 2 different techniques, 1 involving 2 and the other 4 separate skin punctures.

**METHODS:** One hundred twenty patients undergoing upper limb surgery were randomized to receive either (1) an axillary brachial plexus block involving 2 injections, with 30 mL local anesthetic injected posterior to the axillary artery (with redirection, as needed, to achieve circumferential spread), plus 10 mL local anesthetic to the musculocutaneous nerve, guided by ultrasound (group 1, n = 56); or (2) 4 separate 10-mL injections to the median, ulnar, radial, and musculocutaneous nerves, using a combined ultrasound and neurostimulation technique (group 2, n = 58). All patients received 40 mL of 0.5% ropivacaine with 1:400,000 epinephrine. The primary outcome was the success rate of the block, defined as anesthesia adequate for surgery. Secondary outcomes were the time to administer the block, time to the onset of motor-sensory block, time to surgical readiness, and incidence of adverse events.

**RESULTS:** The 2-injection technique was slightly faster to administer (8 vs 11 minutes, P = 0.003). The mean nerve block score was slightly higher for the 4-injection group at the 10-, 15-, 20-, and 30-minute time points, but the cumulative percentages of blocks having taken effect were not significantly different over these time points, at 0.0%, 5.4%, 12.5%, and 37.5% among those who had received a 2-injection block versus 6.9%, 10.4%, 19.0%, and 48.3%, respectively, with the 4-injection block (P = 0.20). There was no difference in the percentage of patients with complete block by 30 minutes (32.1% vs 37.5%, P = 0.55) or in final block success rates (89.3% vs 87.9%, P = 0.99).

**CONCLUSIONS:** An ultrasound-guided 2-injection axillary block may be as effective as, and more time efficient than, a 4-injection technique.

## 低體溫對於成人心肺復蘇後的神經保護

**Hypothermia For Neuroprotection In Adults After Cardiopulmonary Resuscitation**

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Anesth Analg 2010; 110:1239;

**背景**：在心臟停搏之後神經系統很難有好的轉歸。在復蘇階段進行幹預和事件後第一時間的治療是非常關鍵的。實驗證據表明治療性的低體溫是有幫助的，已經有大量關於這方面臨床研究的文章發表了。
**目的**：我們進行一個系統性的回顧與薈萃分析來評估治療性低體溫對心臟停搏後患者的有效性。神經系統的轉歸、存活和不良事件是我們主要的轉歸參數。如果資料能夠獲得，就進行個別患者的資料分析，並根據心臟停搏的情況分成不同的亞組，
**搜索方法**：我們搜索了以下的資料庫：Cochrane 中心對照試驗註冊資料庫（Cochrane 圖書館，2007，第 1 版）、MEDLINE（1971 年到 2007 年 1 月）、EMBASE（1987 到 2007 年 1 月）、CINAHL（1988 到 2007 年 1 月）、PASCAL（2000 到 2007 年 1 月)和 BIOSIS（1989 到 2007 年 1 月）。
**選擇標準**：我們涵蓋了所有評估治療性低體溫在心臟停跳後應用，而沒有語言能力喪失的有效性的隨機對照實驗。研究限定為在心臟停搏後 6 小時之內應用任何降溫方法來降溫的成人。
**資料收集和分析**：有效的措施、幹預、轉歸參數和附加基礎變數收集到資料庫。只有在有可忽略的異質性的相似研究的亞組中進行薈萃分析。因為這些研究的各個患者的資料是可以得到的。
**主要結果**：報導了 481 例患者的 4 個試驗和一個摘要收入在本系統性回顧中。其中 3/5 的研究品質是比較好的。運用常規降溫方法的三個對比研究的所有作者都提供了每個患者的資料。相對於標準的復蘇後監護，運用常規降溫方法的低體溫組更可能在住院期間達到一個最好的腦表現範疇 1 或 2 分的得分（CPC，5 分制；1 為好的腦表現，5 為腦死亡）（個別病人的數據；RR，1.55；95%CI 1.22-1.96），更可能存活到出院（個別病人的資料；RR，1.35；95%CI 1.10-1.65）。在所有的研究中低體溫組和對照組在報導的不良事件方面沒有顯著性差異。
**作者的結論**：常規的降溫方法引起的輕度治療性低體溫可以改善心臟停搏後的生存率和神經系統的轉歸。我們的綜述支援國際復蘇指南推薦的這個當前最好的治療手段。
（唐亮 譯　馬皓琳 李士通 校）

**BACKGROUND:** Good neurologic outcome after cardiac arrest is hard to achieve. Interventions during the resuscitation phase and treatment within the first hours after the event are critical. Experimental evidence suggests that therapeutic hypothermia is beneficial, and a number of clinical studies on this subject have been published.
**OBJECTIVES:** We performed a systematic review and meta-analysis to assess the effectiveness of therapeutic hypothermia in patients after cardiac arrest. Neurologic outcome, survival and adverse events were our main outcome parameters. We aimed to perform individual patient data analysis if data were available, and to from subgroups according to the cardiac arrest situation.
**SEARCH STRATEGY:** We searched the following databases: the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library, 2007 Issue 1); MEDLINE

(1971 to January 2007); EMBASE (1987 to January 2007); CINAHL (1988 to January 2007); PASCAL (2000 to January 2007); and BIOSIS (1989 to January 2007).

**SELECTION CRITERIA:** We included all randomized controlled trials assessing the effectiveness of the therapeutic hypothermia in patients after cardiac arrest without language restrictions. Studies were restricted to adult populations cooled with any cooling method applied within six hours of cardiac arrest.

DATA COLLECTION AND ANALYSIS: Validity measures, the intervention, outcome parameters and additional baseline variables were entered into the database. Meta-analysis was only done for a subset of comparable studies with negligible heterogeneity. For these studies individual patient data were available.

**MAIN RESULTS:** Four trials and one abstract reporting on 481 patients were included in the systematic review. Quality of the included studies was good in three out of five included studies. For the three comparable studies on conventional cooling methods all authors provided individual patient data. With conventional cooling methods patients in the hypothermia group were more likely to reach a best cerebral performance categories score of one or two (CPC, five point scale; 1=good cerebral performance, to 5=brain death) during hospital stay (individual patient data; RR, 1.55; 95% CI 1.22 to 1.96) and were more likely to survive to hospital discharge (individual patient data; RR, 1.35; 95% CI 1.10 to 1.65) compared to standard post-resuscitation care. Across all studies there was no significant difference in reported adverse events between hypothermia and control.

**AUTHORS' CONCLUSIONS:** Conventional cooling methods to induce mild therapeutic hypothermia seem to improve survival and neurologic outcome after cardiac arrest. Our review supports the current best medical practice as recommended by the International Resuscitation Guidelines.

## 一個簡易圍手術期睡眠呼吸暫停預測評分的衍生和驗證

**Derivation and Validation of a Simple Perioperative Sleep Apnea Prediction Score .**

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**背景**：阻塞性睡眠呼吸暫停（OSA）常未被診斷而又普遍存在，其術前明確診斷對圍術期處理有重要意義。作者此研究目的是確定一些普通手術患者 OSA 診斷的臨床獨立預測因數，在此基礎上建立一種圍手術期睡眠呼吸暫停的預測評分（P - SAP），並通過夜間多導睡眠圖的標準診斷來驗證 P - SAP 評分。

**方法**：此項回顧性，觀察性研究針對術前 OSA 明確診斷的患者。獨立 OSA 診斷預測因數由 Logistic 回歸得出，在此基礎上預測工具（對 SAP 的評分）建立。該 P - SAP 的得分，用夜間多導睡眠監測進行驗證。

**結果**：該 P - SAP 的評分是得自接受麻醉的 43576 例成人患者。其中，3884 例（7.17%）有診斷為 OSA。3 個人口統計變數：年齡> 43 歲，男性，肥胖; 3 個既往史變數：打鼾，2 型糖尿病和高血壓;和 3 個氣道測量變數：厚厚的頸部，改良 Mallampati 3 或 4 級，並減少甲頦距離被確定為獨立的 OSA 診斷預測因數。將診斷閾值的 P - SAP 的評分設定為≥2 具有出色的靈敏度（0.939），但特異性差（0.323），而診斷閾值 P - SAP 的評分設定為≥6 時，靈敏度差（0.239）而特異性較好（0.911）。在 512 例患者中驗證此 P - SAP 的評分，其有類似的準確性。
**結論**：隨著症狀的由輕到重，P - SAP 的評分預測 OSA 的準確度也隨之上升。該 P - SAP 的評分來自有代表性的大學醫院外科患者。
（劉世文　譯　陳傑　校）

**BACKGROUND:** Obstructive sleep apnea (OSA) is a largely underdiagnosed, common condition, which is important to diagnose preoperatively because it has implications for perioperative management. Our purpose in this study was to identify independent clinical predictors of a diagnosis of OSA in a general surgical population, develop a perioperative sleep apnea prediction (P-SAP) score based on these variables, and validate the P-SAP score against standard overnight polysomnography.
**METHODS:** A retrospective, observational study was designed to identify patients with a known diagnosis of OSA. Independent predictors of a diagnosis of OSA were derived by logistic regression, based on which prediction tool (P-SAP score) was developed. The P-SAP score was then validated in patients undergoing overnight polysomnography.
**RESULTS:** The P-SAP score was derived from 43,576 adult cases undergoing anesthesia. Of these, 3884 patients (7.17%) had a documented diagnosis of OSA. Three demographic variables: age >43 years, male gender, and obesity; 3 history variables: history of snoring, diabetes mellitus Type 2, and hypertension; and 3 airway measures: thick neck, modified Mallampati class 3 or 4, and reduced thyromental distance were identified as independent predictors of a diagnosis of OSA. A diagnostic threshold P-SAP score ≥2 showed excellent sensitivity (0.939) but poor specificity (0.323), whereas for a P-SAP score ≥6, sensitivity was poor (0.239) with excellent specificity (0.911). Validation of this P-SAP score was performed in 512 patients with similar accuracy.
**CONCLUSION:** The P-SAP score predicts diagnosis of OSA with dependable accuracy across mild to severe disease. The elements of the P-SAP score are derived from a typical university hospital surgical population.

## 全身麻醉期間頭盔顯示器（HMD）監測：一項手術室的臨床評估

**Monitoring with Head-Mounted Displays in General Anesthesia: A Clinical Evaluation in the Operating Room.**

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**背景**：麻醉醫師在手術室時執行某些操作時很難看到病人的監護。HMD 可以通過將病人的生命體征資料傳遞到麻醉醫生的視野來幫助麻醉醫生監測患者。模擬研究表明，通過使用 HMD 麻醉醫師可以花更多的時間監測病人並花更少的時間在檢測儀上。作者設計了一項臨床試驗擬檢測 HMD 是否適用於實踐。
**方法**：6 名麻醉主治醫生對行硬式膀胱鏡檢查的患者進行麻醉。每位麻醉醫生行 6 例麻醉交替使用標準監測飛利浦 IntelliVue™MP70 和標準的監測另加頭盔顯示器（Microvision Nomad™ ND2000 HMD）監測。HMD 與 MP70 監測無線連接並顯示波形和數位性生命體征的資料。記錄所有病例過程並進行分析以確定時間，以及在麻醉工作站看的頻率和時間，病人和手術期間各麻醉階段的一些情況。使用重複測量的方差分析來統計兩種顯示方式的差異。
**結果**：視頻資料收集來自 36 個病例，持續時間為 7～75 分鐘（平均 31 分鐘）。參加者使用 HMD 顯示器與標準的監測相比，他們花更少的時間在麻醉工作站（21.0%比 25.3%，p= 0.003）和更多的時間觀測病人和手術野（55.9%比 51.5%，p= 0.014）。該 HMD 顯示對不論是觀察患者頻率或觀察患者、術野或麻醉工作站的平均時間均無影響。
**結論**：在正常麻醉中使用 HMD 可減少麻醉醫生對麻醉工作站監視，並允許他們花更多的時間在監測病人麻醉和手術。需要更多的研究來確定行為改變是否可以提高麻醉醫師在手術室的工作效能。
（張磊　譯　陳傑　校）

**BACKGROUND:** Patient monitors in the operating room are often positioned where it is difficult for the anesthesiologist to see them when performing procedures. Head-mounted displays (HMDs) can help anesthesiologists by superimposing a display of the patient's vital signs over the anesthesiologist's field of view. Simulator studies indicate that by using an HMD, anesthesiologists can spend more time looking at the patient and less at the monitors. We performed a clinical evaluation testing whether this finding would apply in practice.
**METHODS:** Six attending anesthesiologists provided anesthesia to patients undergoing rigid cystoscopy. Each anesthesiologist performed 6 cases alternating between standard monitoring using a Philips IntelliVue™ MP70 and standard monitoring plus a Microvision Nomad™ ND2000 HMD. The HMD interfaced wirelessly with the MP70 monitor and displayed waveform and numerical vital signs data. Video was recorded during all cases and analyzed to determine the percentage of time, frequency, and duration of looks at the anesthesia workstation and at the patient and surgical field during various anesthetic phases. Differences between the display conditions were tested for significance using repeated-measures analysis of variance.
**RESULTS:** Video data were collected from 36 cases that ranged from 17 to 75 minutes in duration (median 31 minutes). When participants were using the HMD, compared with standard monitoring, they spent less time looking toward the anesthesia workstation

(21.0% vs 25.3%, *P* = 0.003) and more time looking toward the patient and surgical field (55.9% vs 51.5%, *P* = 0.014). The HMD had no effect on either the frequency of looks or the average duration of looks toward the patient and surgical field or toward the anesthesia workstation.

**CONCLUSIONS:** An HMD of patient vital signs reduces anesthesiologists' surveillance of the anesthesia workstation and allows them to spend more time monitoring their patient and surgical field during normal anesthesia. More research is needed to determine whether the behavioral changes can lead to improved anesthesiologist performance in the operating room.

## 非專業人員使用 Airway Scope（R）可視喉鏡、Airtraq(R)可視喉鏡或 Macintosh 直接喉鏡行困難氣道插管：模擬人插管教學比較

**Tracheal Intubation of a Difficult Airway Using Airway Scope, Airtraq, and Macintosh Laryngoscope: A Comparative Manikin Study of Inexperienced Personnel .**

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**背景**：Airway Scope 喉鏡(Pentax-AWS®, Hoya Corp., Tokyo, Japan)和 Airtraq(R)可視喉鏡(Prodol, Vizcaya, Spain)的喉鏡片結構相似。本研究採用模擬人困難氣道來評估 Airway Scope 喉鏡，和 Airtraq(R)視頻喉鏡，以及 Macintosh 直接喉鏡對初學者困難氣道插管的易用性。

**方法**：24 名五年級醫學生，之前未經過氣道插管的培訓。使用先進的模型人(SimMan®, Laerdal Medical, Stavanger, Norway)，類比不同困難氣道情況包括：頸椎強直，張口受限，咽喉狹窄等。器材以及困難氣道方式的選擇均為隨機。對氣管插管成功率，聲門暴露時間，插管，肺機械通氣，最佳手法的數量，以及翹牙聲響等進行分析。以四種不同方案在 24 名學生中進行測試來評估三種不同的插管裝置。

**結果**：與 Macintosh 直接喉鏡 ML 比較，AWS 和 ATQ 均有著較高的插管成功率（AWS 100%*;ATQ 98%*; Macintosh 直接喉鏡 89%; *$P < 0.05$ AWS, ATQ vs ML)；AWS 插管所需時間顯著快於 ATQ 和 ML (AWS 11 ± 6 秒; ATQ 16 ± 12 秒; and ML 16 ± 11 秒; *$P < 0.05$ AWS vs ATQ, ML)；最佳手法的數量在使用 AWS 時明顯低於 ATQ 和 ML；翹牙聲響的發生率在 ML 顯著多於 AWS 和 ATQ。

**結論**：Airway Scope 喉鏡和 Airtraq(R)可視喉鏡適用於初學者處理模擬人困難氣道，但仍需進一步的臨床研究來證實這些發現。

（葉樂　譯　陳傑　校）

**BACKGROUND:** The Airway Scope (AWS) (Pentax-AWS®, Hoya Corp., Tokyo, Japan) and the Airtraq® (ATQ) (Prodol, Vizcaya, Spain) have similarities in the novel structures of their blades. In this study, we evaluated the ease of use of the AWS and ATQ compared with the Macintosh laryngoscope (ML) by inexperienced personnel in a simulated manikin difficult airway.
**METHODS:** Twenty-four fifth-year medical students with no previous experience in tracheal intubation participated in this study. We used an advanced patient simulator (SimMan®, Laerdal Medical, Stavanger, Norway) to simulate difficult airway scenarios including cervical spine rigidity, limited mouth opening, and pharyngeal obstruction. The sequences in selecting devices and scenarios were randomized. Success rates for tracheal intubation, and the time required for visualization of the glottis, tracheal intubation, and inflation of the lungs, and the number of optimization maneuvers and dental click sounds were analyzed. The 3 different intubation devices were tested in 4 different scenarios by 24 students.
**RESULTS:** Both the AWS and ATQ had very high success rates of tracheal intubation compared with the ML (AWS 100%*; ATQ 98%*; and ML 89%; *$P$ < 0.05 AWS, ATQ versus ML). The time to intubation with the AWS was significantly shorter than with the ATQ and ML (AWS 11 ± 6 seconds; ATQ 16 ± 12 seconds; and ML 16 ± 11 seconds; *$P$ < 0.05 AWS versus ATQ, ML). The number of optimization maneuvers with the AWS was significantly lower than with the ATQ and ML. There were significantly more audible dental click sounds with the ML than with the AWS and ATQ.
**CONCLUSION:** Both the AWS and ATQ may be suitable devices for difficult intubation by inexperienced personnel in this manikin simulated scenario. Further studies in a clinical setting are necessary to confirm these findings.

## 喉罩或氣管內插管用于經皮擴張氣管造口術：氣管內結構可見性比較

**Laryngeal Mask Airway or Endotracheal Tube for Percutaneous Dilatational Tracheostomy: A Comparison of Visibility of Intratracheal Structures.** Ulf Linstedt, MD, PhD*, Michael Zenz, MD, Kirsten Krull, MD*, Dietrich Häger, MD* and Andreas W. Prengel, MD, PhD
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目的：經皮擴張氣管造口術（PDT）中的一些嚴重併發症可能與氣管結構的暴露欠佳有關。一般認為喉罩(LMA)提供的支氣管鏡下視野似乎優於氣管內插管(ETT)。在本前瞻性，隨機性研究中，作者採用 LMA 和 ETT 作為通氣設備應用於 PDT 中，比較氣管結構的暴露程度，同時記錄通氣品質和氣道相關併發症。
方法：在本前瞻性，隨機研究中，使用喉罩（LMA，33 例）或氣管內插管（ETT，30 例）完成 PDT。通氣品質和氣管結構可見性（甲狀腺，環狀軟骨，氣管軟骨）分級如下：非常好（1），良好（2），困難（3），LMA/ETT 不可行（4）。第四級需

要備用氣道。組間比較採用卡方檢驗。**結果**：使用喉罩的氣管結構可見性較好：94%使用喉罩的患者等級為 1 或 2，而使用氣管內插管則為 66%（P <0.05）。97%使用喉罩的患者氣管穿刺時視覺化分級為 1 或 2，而使用氣管內插管的為 77%（P <0.05）。LMA 組出現 1 例 4 級患者，氣管導管有 3 例。血流動力學指標兩組相似。PDT 術中血氣分析顯示兩組動脈血氧分壓均降低，二氧化碳分壓都升高，但 ETT 組比 LMA 組更為顯著（59 ± 14 mm Hg vs 51 ± 11 mm Hg , *P* < 0.05）.。在 ETT 組，發生 2 例意外拔管，並且另一位病人由於氣管穿刺部位視野暴露不佳造成氣管鏡損壞。**結論**：就氣管結構和經皮擴張過程的可見性而言，LMA 與 ETT 相比具有一定的優勢。尤其便於缺乏經驗的重症監護師使用，且應用於困難氣道病人，提高可見性能改善操作條件。

（舒慧剛　譯　陳傑　校）

**PURPOSE:** Some severe complications during percutaneous dilatational tracheostomy (PDT) may be related to poor visualization of tracheal structures. Subjectively, the bronchoscopical view obtained via a laryngeal mask airway (LMA) seems to be better than that obtained with an endotracheal tube (ETT). In this prospective, randomized study, we compared LMA and ETT as the ventilatory device during PDT mainly with respect to visualization of tracheal structures. The quality of ventilation and airway-related complications are also reported.

**METHODS:** In this prospective, randomized study, PDT was performed using an LMA (*n* = 33) or an ETT (*n* = 30). Quality of ventilation and visualization of tracheal structures (thyroid, cricoid, and tracheal cartilages) were rated as follows: very good (1), good (2), difficult (3), and not possible (4) with LMA/ETT. A rating of 4 required the alternate airway. Groups were compared using the $\chi^2$ test.

**RESULTS:** Visualization of tracheal structures was better with the LMA: ratings were 1 or 2 in 94% of patients with an LMA, compared with 66% of patients with an ETT (*P* <0.05). Visual control during puncturing the trachea was 1 or 2 in 97% of patients using an LMA and 77% of patients for an ETT (*P* < 0.05). A rating of 4 was assigned to 1 patient with an LMA and to 3 patients with an ETT. Hemodynamic variables were similar in both groups. Blood gas analysis during PDT showed decreased $PaO_2$ in both groups, and increased $PaCO_2$, which was more pronounced with an ETT compared with an LMA (59 ± 14 mm Hg and 51 ± 11 mm Hg [*P* < 0.05]). In the ETT group, 2 patients were extubated accidentally, and in another patient, the bronchoscope was damaged because of insufficient visualization of the tracheal puncture site.

**CONCLUSION:** The LMA technique showed definite advantages regarding visualization of relevant tracheal structures and the dilation process compared with an ETT. This may be especially relevant in the hands of inexperienced intensivists and in cases of difficult patient anatomy where improved structural visualization optimizes operating conditions.

## 兒童及其家長的圍術期行為即時評估：圍術期成人兒童交互作用量表的應用與驗證

**Real-Time Assessment of Perioperative Behaviors in Children and Parents:**

**Development and Validation of the Perioperative Adult Child Behavioral Interaction Scale.**

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**背景：**門診小兒手術中不良事件可導致術後適應不良行為的發生，如發脾氣，夢魘，尿床，尋求關注等。目前可用的圍術期行為評估工具對於指導幹預改善術後適應不良行為的實用性有限，因為它們不能即時使用，僅限於某個階段（如圍術期），或僅提供兒童的靜態評估（如焦慮水準）。為了鑒別在圍術期任意時間點是兒童還是家長對於不良事件的應答行為受益於即時行為幹預需要一個簡單可靠的即時工具。作者研究目的是：（1）完善圍手術期成人兒童行為的互動量表（PACBIS），以改善其對圍手術期行為識別的可靠性（2）通過與以往的認可的方法對比來證實改良後的PACBIS。

**方法：**用 PACBIS 來評估 89 例 3 歲至 12 歲的行增殖腺扁桃體切除術的兒童及其家長的圍術期行為。使用 PACBIS 來評估兒童和/或父母在圍手術期遭受的可能不良刺激事件（圍術期血壓監測，麻醉誘導和拔除靜脈留置針）。分別採用改良耶魯術前焦慮量表(mYPAS)和誘導期順從性量表（ICC）來靜態測量術前焦慮水準和麻醉誘導過程中的順從性。每個事件都被錄影後 用兒童成人醫學操作互動量表短表(CAMPIS-SF)和傷害動作觀察量表(OSBD)進行最後評分。採用線性加權卡帕（κw）分析了評分間可靠度並用 Spearman 相關係數進行了多重驗證。

**結果：**PACBIS 表現出很好的可靠性，其卡帕值範圍為 0.62 至 0.94。兒童的心理應對及不良應激 PACBIS 因數分與改良耶魯術前焦慮量表，誘導期順從性量表（ICC），兒童成人醫學操作互動量表短表(CAMPIS-SF)和傷害動作觀察量表(OSBD)有很強的相關性。家長的 PACBIS 正性因數分與 CAMPIS-SF 和 OSBD 明顯相關，而其負性因數分與 ICC 顯著相關。PACBIS 具有較強的指導和預測效應。

**結論：**PACBIS 是一個簡單，易用，即時的評估兒童和家長圍手術期行為的工具。它有優良的可靠性並與目前公認的方法有相同的效度。PACBIS 能即時鑒別兒童或家長的適應不良行為，使其能及時進行幹預和改善。

（丁俊雲　譯　陳傑　校）

**BACKGROUND:** Behavior in response to distressful events during outpatient pediatric surgery can contribute to postoperative maladaptive behaviors, such as temper tantrums, nightmares, bed-wetting, and attention seeking. Currently available

perioperative behavioral assessment tools have limited utility in guiding interventions to ameliorate maladaptive behaviors because they cannot be used in real time, are only intended to be used during 1 phase of the experience (e.g., perioperative), or provide only a static assessment of the child (e.g., level of anxiety). A simple, reliable, real-time tool is needed to appropriately identify children and parents whose behaviors in response to distressful events at any point in the perioperative continuum could benefit from timely behavioral intervention. Our specific aims were to (1) refine the Perioperative Adult Child Behavioral Interaction Scale (PACBIS) to improve its reliability in identifying perioperative behaviors and (2) validate the refined PACBIS against several established instruments.

**METHODS:** The PACBIS was used to assess the perioperative behaviors of 89 children aged 3 to 12 years presenting for adenotonsillectomy and their parents. Assessments using the PACBIS were made during perioperative events likely to prove distressing to children and/or parents (perioperative measurement of blood pressure, induction of anesthesia, and removal of the IV catheter before discharge). Static measurements of perioperative anxiety and behavioral compliance during anesthetic induction were made using the modified Yale Preoperative Anxiety Scale and the Induction Compliance Checklist (ICC). Each event was videotaped for later scoring using the Child-Adult Medical Procedure Interaction Scale-Short Form (CAMPIS-SF) and Observational Scale of Behavioral Distress (OSBD). Interrater reliability using linear weighted kappa ($\kappa_w$) and multiple validations using Spearman correlation coefficients were analyzed.

**RESULTS:** The PACBIS demonstrated good to excellent interrater reliability, with $\kappa_w$ ranging from 0.62 to 0.94. The Child Coping and Child Distress subscores of the PACBIS demonstrated strong concurrent correlations with the modified Yale Preoperative Anxiety Scale, ICC, CAMPIS-SF, and OSBD. The Parent Positive subscore of the PACBIS correlated strongly with the CAMPIS-SF and OSBD, whereas the Parent Negative subscore showed significant correlation with the ICC. The PACBIS has strong construct and predictive validities.

**CONCLUSIONS:** The PACBIS is a simple, easy to use, real-time instrument to evaluate perioperative behaviors of both children and parents. It has good to excellent interrater reliability and strong concurrent validity against currently accepted scales. The PACBIS offers a means to identify maladaptive child or parental behaviors in real time, making it possible to intervene to modify such behaviors in a timely fashion.

## 選擇性 β－腎上腺素受體阻斷劑後處理而非預處理對暫時性前腦缺血大鼠海馬區的神經保護作用

**Posttreatment but Not Pretreatment with Selective β-Adrenoreceptor 1 Antagonists Provides Neuroprotection in the Hippocampus in Rats Subjected to Transient Forebrain Ischemia.**

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**背景**：β-腎上腺素受體阻斷劑對大鼠局灶性腦缺血有神經保護作用，但對實驗性全腦缺血的影響尚不清楚。β-腎上腺素受體阻斷劑對缺血性損傷後脆弱的腦組織的作用還未研究。因此，作者研究了缺血前或缺血後應用普奈洛爾（非選擇性 β-腎上腺素受體拮抗劑），艾司洛爾和蘭地洛爾（選擇性 β1-腎上腺素受體拮抗劑）對大鼠前腦缺血的神經保護作用。
**方法**： 雄性 SD 大鼠，夾閉雙側頸總動脈 8 分鐘。在夾閉前 30 分鐘，或夾閉後 60 分鐘，分別靜脈輸注生理鹽水 10 μL • $h^{-1}$, 普奈洛爾 100 μg • $kg^{-1}$ • $min^{-1}$, 艾司洛爾 200 μg • $kg^{-1}$ • $min^{-1}$ 或蘭地洛爾 50 μg • $kg^{-1}$ • $min^{-1}$，同時輔以異氟醚（濃度 1.5%）麻醉行控制性降壓（約 35㎜Hg）。所有藥物連續輸注至再灌注後 5 天， 5 天后對這些大鼠進行神經學和組織學方面的評估。
**結果**：缺血前採用普奈洛爾，艾司洛爾，或蘭地洛爾預處理對海馬區前腦缺血性損傷沒有神經保護作用。應用普奈諾爾的大鼠的運動活動性更差，死亡率更高（達 64%），但和其他組相比差異無統計學意義。缺血後採用艾司洛爾和蘭地洛爾後處理能降低腦缺血後神經元損傷，而普奈洛爾不能。然而，採用 β-腎上腺素受體阻斷劑或者生理鹽水進行缺血後處理的大鼠的運動活動性均無差異。
**結論**：對夾閉雙側頸總動脈且合併失血性休克的大鼠，採用艾司洛爾和蘭地洛爾進行缺血後處理有神經保護作用，而普奈洛爾無此作用。作者認為，隨著 β 受體阻斷及休克引起系統抑制，不是產生神經保護作用，而是發生腦缺血的發作。
（鄒巧群　譯　陳傑　校）

**BACKGROUND:** β-Adrenoreceptor antagonists provide neuroprotection against focal cerebral ischemia, but the effects of these antagonists on experimental global cerebral ischemia are unknown. That is, the effect of β-adrenoreceptor antagonism in vulnerable brain regions after ischemic insult has not been examined. Therefore, we investigated the neuroprotective effects of preischemic or postischemic administration of propranolol (a nonselective β-adrenoreceptor antagonist), esmolol, and landiolol (selective β-adrenoreceptor 1 antagonists) against forebrain ischemia in rats.
**METHODS:** IV administration of saline 10 μL · $h^{-1}$, propranolol 100 μg · $kg^{-1}$ · $min^{-1}$, esmolol 200 μg · $kg^{-1}$ · $min^{-1}$, or landiolol 50 μg · $kg^{-1}$ · $min^{-1}$ in male Sprague-Dawley rats was started 30 minutes before or 60 minutes after 8-minute bilateral carotid artery occlusion combined with hypotension (35 mm Hg) under isoflurane (1.5%) anesthesia. All drugs were administered continuously until 5 days after reperfusion, and the animals were evaluated neurologically and histologically after this 5-day period.
**RESULTS:** Preischemic treatment with propranolol, esmolol, or landiolol failed to provide neuroprotection against forebrain ischemia in the hippocampus. Rats treated with propranolol tended to have a worse score for motor activity and a higher mortality rate (up to 64%), but the differences with other groups were not statistically significant. Postischemic treatment with esmolol and landiolol, but not with propranolol, reduced neuronal injury after forebrain ischemia. However, motor activity did not differ among rats treated postischemically with any of the β-adrenoreceptor antagonists or saline.

**CONCLUSIONS:** Postischemic treatment with esmolol and landiolol provided neuroprotection in the hippocampus in rats subjected to bilateral carotid artery occlusion combined with hemorrhagic shock, whereas treatment with propranolol failed to show neuroprotection. We suggest that concomitant β-blockade and shock might work as a systemic depressant, rather than a neuroprotectant, resulting in exacerbation of cerebral ischemia.

## 聯合應用撲熱息痛（對乙醯氨基酚）與非甾體抗炎藥：對於急性術後疼痛鎮痛效果的系統評價

**Combining Paracetamol (Acetaminophen) with Nonsteroidal Antiinflammatory Drugs: A Qualitative Systematic Review of Analgesic Efficacy for Acute Postoperative Pain.**

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**背景**：近年來聯合應用非甾體抗炎藥（NSAID）與對乙醯氨基酚（撲熱息痛）進行鎮痛已形成一種趨勢。然而，撲熱息痛和NSAID聯合應用相對於單獨服用的治療優勢仍存在爭議。作者在多種急性疼痛模型中評估了對乙醯氨基酚（撲熱息痛）和非甾體抗炎藥聯合應用與兩種藥物單獨使用的效能。

**方法**：通過對醫學文獻分析和檢索系統、醫學文摘資料庫、護理學和有關衛生學文獻累積索引的系統文獻檢索，涵蓋了從 1988 年 1 月到 2009 年 6 月期間專門比較撲熱息痛與多種非甾體抗炎藥合用與至少這些藥物中的一種藥物單用的人類隨機對照試驗。研究分為 2 組：撲熱息痛與非甾體抗炎藥合用，撲熱息痛或非甾體抗炎藥單用。主要分析疼痛強度評分和鎮痛劑追加量。另外，使用可靠的量表對每個研究進行品質分級。

**結果**：21 項研究共包括 1909 例病人。所用的非甾體抗炎藥有布洛芬（6），雙氯芬酸（8），酮洛芬（3），酮咯酸（1），阿司匹林（1），替諾昔康（1），和羅非昔布（1）。在 85%和 64%的相關研究中撲熱息痛與非甾體抗炎藥聯合應用比撲熱息痛或非甾體抗炎藥單用更有效。疼痛強度及鎮痛劑追加量在聯合用藥與對乙醯氨基酚單用的陽性研究中分別降低了 35.0% ± 10.9% 和 38.8% ± 13.1%，而在聯合用藥與NSAID單用的陽性研究中分別降低了 26.6% 和 31.3% ± 13.4%。實驗組間的中位數品質分差無統計學差異。

**結論**：現有的資料表明，對乙醯氨基酚與非甾體抗炎藥聯合應用較對乙醯氨基酚或非甾體抗炎藥單用可以提供更好的鎮痛效果。

（唐穎　譯　陳傑　校）

**BACKGROUND:** There has been a trend over recent years for combining a nonsteroidal antiinflammatory drug (NSAID) with paracetamol (acetaminophen) for pain management. However, therapeutic superiority of the combination of paracetamol and an NSAID over either drug alone remains controversial. We evaluated the efficacy of the combination of paracetamol and an NSAID versus either drug alone in various acute pain models.
**METHODS:** A systematic literature search of Medline, Embase, Cumulative Index to Nursing and Allied Health Literature, and PubMed covering the period from January 1988 to June 2009 was performed to identify randomized controlled trials in humans that specifically compared combinations of paracetamol with various NSAIDs versus at least 1 of these constituent drugs. Identified studies were stratified into 2 groups: paracetamol/NSAID combinations versus paracetamol or NSAIDs. We analyzed pain intensity scores and supplemental analgesic requirements as primary outcome measures. In addition, each study was graded for quality using a validated scale.
**RESULTS:** Twenty-one human studies enrolling 1909 patients were analyzed. The NSAIDs used were ibuprofen (*n* = 6), diclofenac (*n* = 8), ketoprofen (*n* = 3), ketorolac (*n* = 1), aspirin (*n* = 1), tenoxicam (*n* = 1), and rofecoxib (*n* = 1). The combination of paracetamol and NSAID was more effective than paracetamol or NSAID alone in 85% and 64% of relevant studies, respectively. The pain intensity and analgesic supplementation was 35.0% ± 10.9% and 38.8% ± 13.1% lesser, respectively, in the positive studies for the combination versus paracetamol group, and 37.7% ± 26.6% and 31.3% ± 13.4% lesser, respectively, in the positive studies for the combination versus the NSAID group. No statistical difference in median quality scores was found between experimental groups.
**CONCLUSION:** Current evidence suggests that a combination of paracetamol and an NSAID may offer superior analgesia compared with either drug alone.

## 圍術期使用普瑞巴林能改善腰椎間盤摘除術後 3 個月疼痛和功能恢復

**Perioperative Pregabalin Improves Pain and Functional Outcomes 3 Months After Lumbar Discectomy.**

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**背景**：通過腰椎間盤摘除術治療神經根性腰痛的患者，其預後差異很大且療效不確定。許多患者在術後 3 個月仍然疼痛。普瑞巴林，一種膜穩定劑，有可能降低術中中樞致敏和併發的持續性疼痛。
**方法**： 40 例實施腰椎間盤摘除術的患者使用雙盲法隨機給予普瑞巴林（術前 90 分鐘給予 300mg，術後 12 小時和 24 小時給予 150mg）或在對應時間給予安慰劑。主要觀察術前至術後 3 個月疼痛強度（PPI）（視覺評估量表 VAS，0-100mmPPI-VAS，麥-吉疼痛問卷）的改變。

**結果**：3 個月期間，接受普瑞巴林治療的患者其疼痛強度的 VAS 評分（37.6± 19.6㎜）(均數± 標準差)較接受安慰劑治療的患者(25.3 ± 21.9 ㎜) (*P* = 0.08) 明顯降低。3 個月期間，接受普瑞巴林治療的患者其 Roland-Morris 功能障礙分數 (2.7 ± 2.4)低於安慰劑治療的患者(5.6 ± 4.8) (*P* = 0.032)。術後 24 小時，與安慰劑相比，普瑞巴林使用後雙下肢痛域有所提高。

**結論**：圍術期使用普瑞巴林與腰椎間盤摘除術後 3 個月疼痛強度降低和改善術後功能恢復有關。

（楊秋娟　譯　陳傑　校）

**BACKGROUND:** Patient outcome after lumbar discectomy for radicular low back pain is variable and the benefit is inconsistent. Many patients continue to experience pain 3 months after surgery. Pregabalin, a membrane stabilizer, may decrease perioperative central sensitization and subsequent persistent pain.

**METHODS:** Forty patients undergoing lumbar discectomy were randomly allocated to receive either pregabalin (300 mg at 90 minutes preoperatively and 150 mg at 12 and 24 hours postoperatively) or placebo at corresponding times in a double-blinded manner. Our primary outcome was the change in the present pain intensity (PPI) (visual analog scale [VAS], 0–100 mm [PPI-VAS, McGill Pain Questionnaire]) from preoperatively to 3 months postoperatively.

**RESULTS:** The decrease in PPI-VAS score at 3 months was greater in patients who received pregabalin (37.6 ± 19.6 mm) (mean ± SD) than those who received placebo (25.3 ± 21.9 mm) (*P* = 0.08). The Roland Morris disability score at 3 months was less in patients who received pregabalin (2.7 ± 2.4) than in those who received placebo (5.6 ± 4.8) (*P* = 0.032). Pregabalin administration was associated with greater pain tolerance thresholds in both lower limbs compared with placebo at 24 hours postoperatively.

**CONCLUSION:** Perioperative pregabalin administration is associated with less pain intensity and improved functional outcomes 3 months after lumbar discectomy.

## 新型氨基酸-異纈氨酸的鎮痛特性

**Analgesic Properties of the Novel Amino Acid, Isovaline.**

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**背景**：異纈氨酸，一種生物圈中罕見的非蛋白質 a-氨基酸，在結構上類似於抑制性神經遞質甘氨酸和 γ-氨基丁酸。由於甘氨酸和 γ-氨基丁酸受體激動劑具有抗痛覺超敏作用，作者推測異纈氨酸能在小鼠中產生鎮痛作用。

**方法**：雌性 CD - 1 小鼠，雙盲、隨機、對照設計。RS-異纈氨酸的作用通過觀察小鼠對於（1）福馬林注入後爪;（2）谷氨酸注入後爪;（3）士的甯注入腰椎管內或者小腦延髓池傷害性疼痛反應來判斷。通過後爪注入福馬林的傷害性疼痛反應來確定靜脈注射 DL 型異纈氨酸（50, 150, 或 500 mg/kg; n=10）或腰椎鞘內注射

DL 型，D 型和 L 型 異纈氨酸，甘氨酸和 γ-氨基丁酸（60, 125, 250 和 500 mmol 每 5μL ; *n=9*）的作用。比較足底注射 20 μL 谷氨酸(750 mmol)和注射谷氨酸(750 mmol)複合異纈氨酸的反應。另外確定足底注射士的寧的反應。腰椎椎管內（100μM)）或腦池內（200 μM)）士的寧注射到腰椎椎管內空間或小腦延髓池誘導異常性疼痛以此衡量甘氨酸的抑制功能障礙。比較鞘內注射或腦池內注射士的寧和注射異纈氨酸複合士的寧的作用（ n=8 ）。

**結果**：在福馬林的實驗中，靜脈注射異纈氨酸第一階段沒有改變，但降低第二階段的反應且呈劑量依賴性（50% 有效劑量為 66 mg/kg, $n = 10$, $P < 0.01$）。對於小鼠的旋轉活動，形態，或行為無影響，也沒有呼吸抑制。鞘內注射異纈氨酸，甘氨酸和 β-丙氨酸減弱第一和第二階段的反應（$P < 0.01$ 每個藥物）。與 β-丙氨酸和甘氨酸比較，異纈氨酸在最大有效劑量不產生搔抓，撕咬，或激動。鞘內注射 DL 型和 D 型異纈氨酸減弱第一階段反應（$P < 0.05$ 每組）和注射 DL 型，D 型和 L 型 異纈氨酸減弱第二階段的反應（$P < 0.05$ 每組），在療效上 D 型和 L 型異構體間並無顯著性差異。腦池內（$P < 0.01$）和鞘內注射（$P < 0.01$）異纈氨酸均能顯著減輕士的甯誘導的甘氨酸抑制性功能障礙。雖然足底注射士的寧沒有引起外周異常痛覺，但是高劑量的異纈氨酸並不能阻止谷氨酸誘導的痛覺異常。
**結論**：異纈氨酸能降低小鼠的疼痛反應，但不產生急性毒性，可能是通過增強傷害性疼痛資訊的受體調節來實現的。
（張蕾　譯　陳傑　校）

**BACKGROUND:** Isovaline, a nonproteinogenic α-amino acid rarely found in the biosphere, is structurally similar to the inhibitory neurotransmitters glycine and γ-aminobutyric acid. Because $glycine_A$ and γ-aminobutyric acid receptor agonists are antiallodynic, we hypothesized that isovaline produces antinociception in mice.
**METHODS:** All experiments were performed on female CD-1 mice using a blinded, randomized, and controlled design. The effects of RS-isovaline were studied on nociceptive responses to (1) formalin injection into the hindpaw; (2) glutamate injection into the hindpaw; and (3) strychnine injection either into the lumbar intrathecal space or cisterna magna. We determined the effects of IV RS-isovaline (50, 150, or 500 mg/kg; $n = 10$/dose) or intrathecal RS-, R-, and S-isovaline, glycine, and β-alanine into the lumbar intrathecal space (5-μL volumes of 60, 125, 250, and 500 mM; $n = 9$/dose/group) on the response to formalin in the paw. The response to 20 μL intraplantar glutamate (750 mM) was compared with glutamate (750 mM) coadministered with isovaline. We also determined the response to intraplantar strychnine. Lumbar intrathecal (100 μM) or intracisternal (200 μM) injections of strychnine into the lumbar intrathecal space or the cisterna magna were used to induce allodynia as a measure of glycine inhibitory dysfunction. The effects of intrathecal or intracisternal strychnine were compared with isovaline coapplied with the strychnine ($n = 8$/group).
**RESULTS:** In the formalin paw test, IV isovaline did not change phase I but decreased phase II responses in a dose-dependent manner (50% effective dose = 66 mg/kg, $n = 10$, $P < 0.01$). There was no effect on rotarod performance, appearance, or behavior of the mouse, and no respiratory depression. Intrathecal isovaline, glycine, and β-alanine

attenuated phase I and II responses ($P < 0.01$ for each drug). In contrast to β-alanine and glycine, isovaline at maximally effective doses did not produce scratching, biting, or agitation. Intrathecal RS- and S-isovaline attenuated phase I ($P < 0.05$ for each group) and RS-, R-, and S-isovaline attenuated phase II responses ($P < 0.05$ for each group), with no significant difference between the efficacies of R- and S-enantiomers. Localized strychnine-induced glycine inhibitory dysfunction was greatly reduced by intracisternal ($P < 0.01$) and intrathecal ($P < 0.01$) isovaline. Although intraplantar strychnine did not induce peripheral allodynia, high doses of isovaline did not block the peripheral allodynia induced by glutamate.

**CONCLUSIONS:** Isovaline reduced responses in mouse pain models without producing acute toxicity, possibly by enhancing receptor modulation of nociceptive information.

## 大鼠靜脈局部麻醉模型

**A Model of Intravenous Regional Anesthesia in Rats**

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**背景**：作者採用大鼠尾巴建立了靜脈局部麻醉模型，評價臨床前靜脈局部麻醉和鎮痛的有效性和安全性。

**方法**： 連續 3 個實驗測定大鼠尾靜脈注入局部麻醉藥和鎮痛藥的有效性。以夾尾試驗的反應來評定麻醉效果，通過記錄甩尾試驗的反應時間來評估鎮痛效果。在前兩個實驗中，分別研究甩尾試驗和夾尾試驗對不同環境溫度(15° C, 25° C, and 37° C)和止血帶時間長度的效應。實驗組 3 在這兩個試驗結果的基礎上，通過比較 1%利多卡因（L 組）和 0.5%布比卡因（B 組）與生理鹽水的藥理作用來評價這個模型。

**結果**：實驗 1，與基礎值相比，15 ° C 組甩尾潛伏期迅速延長（P <0.0001），而尾巴浸泡在水中 20 分鐘後， 25 ° C 組（P = 0.3640）和 37 ° C 組（P = 0.0641）的甩尾潛伏期沒有變化。在整個觀察期，夾尾試驗均為陽性。實驗 2，應用止血帶的前 20 分鐘與基礎值相比，甩尾潛伏期沒有改變（P = 0.0902），但在 30 ，40，50 和 60 分鐘時均顯著延長（P = 0.0001）。所有大鼠夾尾試驗均為陽性。實驗 3， L 和 B 組的尾巴上（止血帶遠端）產生的局部麻醉麻醉起效時間類似（約 1 分鐘），但 B 組的麻醉與鎮痛的恢復時間（56.0 ± 22.0 分鐘）較 L 組（31.0 ± 19.0 分鐘）明顯延長，生理鹽水組沒有麻醉和鎮痛作用。

**結論**：建立了一可靠的靜脈局部麻醉和鎮痛的大鼠模型

**BACKGROUND:** We developed an IV regional anesthesia (IVRA) model using the tails of rats to allow preclinical evaluation of the safety and efficacy of drugs used in IVRA and analgesia.
**METHODS:** Three sequential experiments were designed to determine local anesthetic and analgesic effects of drugs injected IV in the tail. The anesthesia was assessed by monitoring the response of the tail-clamp (RTC) test on the tail, whereas the analgesia was assessed by recording the latency in the tail-flick test on the tail. In the first 2 experiments, we studied the effects of different environmental temperatures (15°C, 25°C, and 37°C) and length of tourniquet time on the tail-flick and tail-clamp tests, respectively. Based on the outcomes of these 2 experiments, the pharmacological effects of 1% lidocaine (L group) and 0.5% bupivacaine (B group) were compared with normal saline (NS group) to evaluate this model in experiment 3.
**RESULTS:** In experiment 1, compared with its baseline, tail-flick latency increased rapidly in the 15°C group ($P < 0.0001$), whereas there were no changes in tail-flick latency in the 25°C group ($P = 0.3640$) and the 37°C group ($P = 0.0641$) after the first 20 minutes of tail submersion in a water bath. RTCs in all rats were positive during the entire observation period. In experiment 2, tail-flick latency did not change compared with baseline tail-flick latency after the first 20 minutes of tourniquet application ($P = 0.0902$), but significantly increased at the 30-, 40-, 50-, and 60-minute intervals ($P = 0.0001$). RTCs in all rats were positive during the experiment. In experiment 3, local anesthesia was generated in the tail (distal to the tourniquet) in the L and B groups with a similar onset time of anesthesia (approximately 1 minute), but with a longer recovery time of anesthesia and analgesia in the B group (56.0 ± 22.0 minutes) than the L group (31.0 ± 19.0 minutes), whereas no anesthetic and analgesic effects were observed in the NS group.
**CONCLUSIONS:** A reliable model for studying IVRA and analgesia has been developed in rats.

## Sugammadex, 一種預防術後殘留肌松的選擇性拮抗藥

**Sugammadex, a Selective Reversal Medication for Preventing Postoperative Residual Neuromuscular Blockade.**

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**背景：** Sugammadex 是第一個選擇性肌松拮抗劑，該藥被證明能逆轉羅庫溴銨和其他甾體類非去極化肌松藥誘導的神經肌肉阻滯。
**目的：**評估 sugammadex 在逆轉甾體類非去極化肌松藥誘導的神經肌肉阻滯和預防術後殘留肌松過程的有效性和安全性。
**檢索方法：**檢索了 Cochrane（CENTRAL）（Cochrane 圖書館 2008 年 第三期），MEDLINE（1950 年至 2008 年 8 月）和 EMBASE（1980 年至 2008 年 8 月）三大資料庫。另外手工檢索了相關文章參考書目和會議摘要。同時聯繫了藥物供應商以獲得更多資訊。

**納入標準：**有關 sugammadex 與安慰劑或其他藥物，或不同劑量的 sugammadex 互相比較的所有隨機對照研究，且研究物件為成人（大於等於 18 歲）。排除非隨機化試驗和健康志願者試驗。
**資料收集和分析：**試驗納入決策，品質評估和資料剔除由專人獨立進行。用標準的 META 分析技術。
**主要結果：**共納入 18 項隨機對照研究（1321 個物件）。7 項為全文發表，11 項為會議摘要。所有納入的研究具有合適的隨機法和盲法。結果表明：與安慰劑或新斯的明相比，無論阻滯程度如何，sugammadex 可以更快地逆轉羅庫溴銨誘導的神經肌肉鬆弛。2mg/kg，4mg/kg，16mg/kg 的 sugammadex 各自在 T2 反應出現，1 到 2 個強直後刺激和應用羅庫溴銨 3 到 5 分鐘後逆轉羅庫溴銨誘導的肌松效應。關於維庫溴銨和泮庫溴銨的研究很少。1%接受藥物的物件出現嚴重不良事件。藥物相關不良事件發生率，sugammadex 和安慰劑無統計學差異（5 個 RCT 研究：危險比 1.20。 95%可信區間 0.61 到 2.37；P 值 0.59，異質性 0%）。另外，sugammadex 和新斯的明在不良事件方面沒有統計學差異（3 個 RCT 研究：危險比 0.98。 95%可信區間 0.48 到 1.98；P 值 0.95，異質性 43%）。
結論：sugammadex 在逆轉羅庫溴銨誘導神經肌肉鬆弛方面被證明是有效的。沒有證據顯示在不良反應方面 sugammadex 與安慰劑或新斯的明有差異。這些結果需要今後更大樣本量及患者相關預後的研究來確認。
（於章傑　譯　陳傑　校）

**BACKGROUND:** Sugammadex is the first selective relaxant binding agent that has been studied for reversal of neuromuscular blockade induced by rocuronium and other steroidal non-depolarizing neuromuscular blocking agents (NMBAs).
**OBJECTIVES:** To assess the efficacy and safety of sugammadex in reversing neuromuscular blockade induced by steroidal non-depolarizing NMBAs and in preventing postoperative residual neuromuscular blockade.
**SEARCH STRATEGY:** We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2008, Issue 3), MEDLINE (1950 to August 2008), and EMBASE (1980 to August 2008). In addition, we handsearched reference lists of relevant articles and meeting abstracts. Furthermore, we contacted the medication's manufacturer for more information.
**SELECTION CRITERIA:** All randomized controlled trials (RCTs) on adult patients ( 18 years old) in which sugammadex was compared with placebo or other medications, or in which different doses of sugammadex were compared with each other. We excluded non-randomized trials and studies on healthy volunteers.
**DATA COLLECTION AND ANALYSIS:** We independently performed determination of trial inclusion, quality assessment, and data extraction. We applied standard meta- analytic techniques.
**MAIN RESULTS:** We included18 RCTs (n=1321 patients). Seven trials were published as full-text papers, and 11 trials only as meeting abstracts. All the included trials had adequate methods of randomization and allocation concealment. The results suggest that, compared with placebo or neostigmine, sugammadex can more rapidly reverse

rocuronium-induced neuromuscular blockade regardless of the depth of the block. We identified 2, 4, and 16 mg/kg of sugammadex for reversal of rocuronium-induced neuromuscular blockade at T2 reappearance , 1 to 2 post-tetanic counts, and 3 to 5 minutes after rocuronium, respectively. The number of trials are very limited regarding vecuronium and pancuronium. Serious adverse events occurred in < 1% of all patients who received the medication. There was no significant difference between sugammadex and placebo in terms of the prevalence of drug-related adverse events (RR 1.20, 95% CI 0.61 to 2.37; P=0.59, I2=0%, 5 RCTs). Also, no significant difference was found between sugammadex and neostigmine for adverse events (RR 0.98, 95% CI 0.48 to1.98; P=0.95, I2=43%, 3 RCTs).

**AUTHORS' CONCLUSIONS:** Sugammadex was shown to be effective in reversing rocuronium-induced neuromuscular blockade. This review has found no evidence of a difference in the instance of unwanted effects between sugammadex, placebo or neostigmine. These results need to be confirmed by future trials on larger patient populations and with more focus on patient-related outcomes.

## 血栓彈力圖檢測分析正常人群對照中年齡及性別對凝血功能的影響

**In Normal Controls, Both Age and Gender Affect Coagulability as Measured by Thrombelastography**

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**背景**：我們旨在利用血栓彈力圖（TEG(R)），這一可同時檢測全血中血漿凝固因數和細胞因數的方法，來分析研究年齡、性別以及口服避孕藥（OCs）的使用對於凝血功能的影響。

**方法**：研究物件為 120 名不同年齡段的健康成人（60 個男性，60 個女性），以及 29 名使用口服避孕藥的健康女性，利用血栓彈力圖分別檢測研究物件未處理過的全血以及枸櫞酸鈣化過的血液。

**結果**：我們發現，女性比男性血液高凝，而同年齡段的女性，使用口服避孕藥者比不使用者血液高凝。此外，我們還發現，隨著年齡的增加，血液更為高凝。應用 Bland 和 Altman 方法（Lancet 1986;1:307-10），我們並沒有發現未處理過的全血與枸櫞酸鈣化過的血液之間存在著關聯。

**結論**：年齡增長、女性、使用口服避孕藥以及低於正常的紅細胞壓積是主要的促凝血因素。用兩種檢測方法比較血栓彈力圖測量結果後發現，未處理過的全血和枸櫞酸鈣化過的血液兩者的凝血時間差異幅度達 20%-246%，由此證實血栓彈力圖測量兩種血液的結果之間並無相關性。此外，其一致性的限制範圍已大大超出了臨床可接受的相關性範圍。

（單嘉琪譯 薛張綱校）

**BACKGROUND**: Our objective was to analyze the effects of age, gender, and the use of oral contraceptives (OCs) on coagulation using thrombelastography (TEG(R)), a single test to analyze both plasma coagulation factors and cellular elements in whole blood.
**METHODS**: TEG(R) variables were measured in native whole blood and in recalcified citrated blood from 120 healthy adults (60 men and 60 women) with various ages and in an additional 29 healthy women using OCs.
**RESULTS**: We observed hypercoagulability in women compared with men and in women using OCs compared with age-matched nonusers. Moreover, we found hypercoagulability with aging. Using the method of Bland and Altman (Lancet 1986;1:307-10), we demonstrated no correlation between TEG(R) measurements in native and recalcified citrated blood.
**CONCLUSIONS**: Aging, female gender, use of OCs, and low-normal hematocrit levels have significant procoagulant effects. TEG(R) measurements in native and recalcified citrated blood are not interchangeable, as indicated by differences between the 2 measurements ranging from 20%in maximal amplitude to 246% in clotting time. Furthermore, the limits of agreement strongly exceeded clinical acceptability to conclude interchangeability.

## 人體皮下給予大劑量多泡脂質體主動包裹的布比卡因證實其可緩釋藥物並不導致全身中毒血漿濃度

**High-dose bupivacaine remotely loaded into multivesicular liposomes demonstrates slow drug release without systemic toxic plasma concentrations after subcutaneous administration in humans.**

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**背景**：貯藏配方可延長局麻藥的鎮痛效果，減少高峰血藥濃度。這可使大劑量使用局麻藥更安全，並進一步延長鎮痛效果的持續時間。我們先前報導開發了大多泡小囊泡（LMVVs）主動包裹的布比卡因（LMVV 脂質體布比卡因），並證實在動物和人類體內其可 5 倍延長鎮痛效果。在此研究中，我們呈現人體內 LMVV 脂質體布比卡因的藥代動力學數據。
**方法**：在這項公開的前瞻性配對對照研究中，健康志願者先予皮下注射 20ml0.5%的普通布比卡因，一星期後，再接受 20ml2%的 LMVV 脂質體布比卡因。
**結果**：共有 8 名受試者參與此項研究。局部麻醉藥的非主觀副作用被觀察。通過血漿藥物濃度-時間表模型評估最大血藥濃度及其達峰時間。兩組間最大血藥濃度

無明顯差異（普通布比卡因 0.87±0.45 microg/mL，脂質體布比卡因 0.83±0.34 microg/mL，P=0.83，無統計學差異）。這些值遠低於公認的 2 至 4 microg/mL 的中毒血藥濃度。對脂質體製劑而言，其達峰時間是普通劑型的 7 倍（262±149 分鐘 vs 37.5±16 分鐘，P<0.01）。
**結論**：儘管新型的脂質體製劑其布比卡因的總使用效率較普通劑型提高了 4 倍，但兩組間血藥濃度峰值並無顯著差異。血漿中脂質體布比卡因的延遲消除和延長再分佈效應與先前所報導的貯藏相關緩釋效應可致藥代動力學效果延長是一致的。
（范羽譯 薛張綱校）

**BACKGROUND**: Depot formulations prolong the analgesic effect of local anesthetics and reduce peak plasma drug concentration. This allows for safer administration of larger doses of local anesthetics, which further prolongs the duration of analgesic effect. We previously reported the development of large multivesicular vesicles (LMVVs) remotely loaded with bupivacaine (LMVV liposomal bupivacaine) and demonstrated a >5-fold prolongation of analgesic effect in animals and humans. In this study, we present pharmacokinetic data of LMVV liposomal bupivacaine in humans.
**METHODS**: Healthy volunteers received subcutaneous injections of 20 mL plain 0.5% bupivacaine and, 1 week later, 20 mL of 2% LMVV liposomal bupivacaine in a prospective, open-label, crossover, controlled study.
**RESULTS**: Eight subjects were studied. No subjective side effects of local anesthetics were observed. The maximal plasma concentration and the time to achieve maximal plasma concentration were assessed by modeling plasma concentration-time profiles. Maximal plasma concentration was not significantly different between groups (0.87 +/- 0.45 microg/mL and 0.83 +/- 0.34 microg/mL for plain and liposomal bupivacaine, respectively; P = not significant, 0.83). These values are well below the putative toxic plasma concentration of 2 to 4 microg/mL. Time to achieve maximal plasma concentration was 7-fold greater for the liposomal preparation (262 +/- 149 minutes vs 37.5 +/- 16 minutes, P < 0.01).
**CONCLUSIONS**: Peak plasma bupivacaine concentrations were not different in the 2 groups, despite a 4-fold increase in total bupivacaine dose administered in the novel liposomal preparation. The delayed elimination and prolonged redistribution of liposomal bupivacaine to plasma is compatible with the depot-related slow-release effect leading to the prolonged pharmacodynamic effect previously reported.

## 試用報告：鼻導管－保留自主呼吸的病人中監測呼末二氧化碳的新工具

**A nasal catheter for the measurement of end-tidal carbon dioxide in spontaneously breathing patients: a preliminary evaluation.**

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Anesth Analg. 2010 April 110(4):1039-42.

**背景**：為了監測保留自主呼吸病人的呼氣末二氧化碳濃度，人們發明瞭許多種工具，可是許多工具的測量並不準確。我們想要通過研究發明一種新型的帶氣囊的鼻導管用於精確監測不插氣管導管保留自主呼吸病人的呼氣末二氧化碳濃度。
**方法**：導管由一個14號的橡膠Foley導管，一個氣管導管前端的氣囊以及一個18號套管針的塑膠外套管組成。導管連接至氣體分析器的採樣管，監測20個不同的健康術後患者在吸氧狀態下的呼氣末二氧化碳與動脈血二氧化碳。
**結果**：呼氣末二氧化碳與動脈血二氧化碳的平均差值為-4.4+/-1.6個標準差。其相關係數r=0.87(P<0.001)
**結論**：研究結果表明，我們的這種帶氣囊的鼻導管可以為未行氣管內插管保留自主呼吸的患者提供一種簡單明瞭可信的監測呼氣末二氧化碳的方法。
（黃劍譯 薛張綱校）

**BACKGROUND**: Several devices have been proposed to monitor end-tidal carbon dioxide tension (Petco(2)) in spontaneously breathing patients; however, many have been reported to be inaccurate. We designed this study to investigate the accuracy of a balloon-tipped nasal catheter in measuring Petco(2) in nontracheally intubated, spontaneously breathing patients.
**METHODS**: The catheter was assembled using a 14-F rubber Foley catheter, a tracheal tube pilot balloon, and the plastic sheath from an 18-gauge needle. The catheter was connected to the sampling tube of a gas analyzer. Petco(2) and Paco(2) were determined simultaneously in 20 otherwise healthy postsurgical patients while receiving oxygen.
**RESULTS**: The mean Petco(2) – Paco(2) difference was -4.4 +/- 1.6 (SD) mm Hg with a correlation coefficient r = +0.87 (P < 0.001).
**CONCLUSION**: Our results suggest that a balloon-tipped nasal catheter can provide a simple, easy, and reliable method for Petco(2) measurement in nontracheally intubated, spontaneously breathing patients.

## 綜述：手術室的血糖測量：比看去複雜

**Review Article: Glucose Measurement in the Operating Room: More Complicated than It Seems**

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血糖異常常見於手術患者，最近幾年圍手術期內嚴格控制血糖很受關注。任何密切控制血糖制度的執行都需要更頻繁地測定血糖，小型，廉價，迅速反映的保健設備可能更合適。但是，圍術期中讓許多麻醉醫生和看護病人的其他工作人員難以理解的是，設計給病人自我監測血糖的家用血糖儀缺乏準確性。這些設備被再銷售給醫院，既沒有適當的附加檢測，也沒有一個適當的規章制度。臨床醫生誰會習慣由一

個中央實驗室設備或自動血氣分析儀高水準測量出的血糖值可能存在潛在的錯誤，這些錯誤是由許多自測血糖儀引起的，尤其是低血糖時。圍手術期的醫生瞭解這些儀器的限制，可以儘量減少出現測量誤差。在本文中，我們將重點介紹並回顧這些儀器的技術和準確性以及圍手術期血糖測量使用儀器的規範。
（李瑩譯 薛張綱校）

Abnormalities of blood glucose are common in patients undergoing surgery, and in recent years there has been considerable interest in tight control of glucose in the perioperative period. Implementation of any regime of close glycemic control requires more frequent measurement of blood glucose, a function for which small, inexpensive, and rapidly responding point-of-care devices might seem highly suitable. However, what is not well understood by many anesthesiologists and other staff caring for patients in the perioperative period is the lack of accuracy of home glucose meters that were designed for self-monitoring of blood glucose by patients. These devices have been remarketed to hospitals without appropriate additional testing and without an appropriate regulatory framework.Clinicians who are accustomed to the high level of accuracy of glucose measurement by a central laboratory device or by an automated blood gas analyzer may be unaware of the potential for harmful clinical errors that are caused by the inaccuracy exhibited by many self-monitoring of blood glucose devices, especially in the hypoglycemic range.Knowledge of the limitations of these meters is essential for the perioperative physician to minimize the possibility of a harmful measurement error. In this article, we will highlight these areas of interest and review the indications, technology, accuracy, and regulation of glucose measurement devices used in the perioperative setting.

## 一個能降低睡眠呼吸暫停綜合症兒童增殖體切除術後呼吸系統併發症的麻醉管理方案

**An Anesthetic Management Protocol to Decrease Respiratory Complications After Adenotonsillectomy in Children with Severe Sleep Apnea**

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**背景**：據報導，在睡眠呼吸暫停綜合症兒童進行增殖體切除術後呼吸系統併發症較高。為了減少併發症，我們在圍術期睡眠研究中出現反復嚴重低氧血症的睡眠呼吸暫停綜合症兒童中遵循了圍術期的指南，它調整了阿片類藥物、地塞米松和阿托品的應用。

**方法**：我們進行了一項回顧性研究，比較了 2001 年以來的歷史資料。主要結局變數是呼吸系統醫療幹預。睡眠呼吸暫停綜合症的嚴重程度用 McGill 血氧測定系統進行評估，關注重點是反復氧飽和度<80%的兒童(MOS4)。

**結果**：在 2002 年 10 月至 2006 年 2 月期間記錄到共有 292 名符合入選標準的兒童進行增殖腺扁桃體切除術，其中記錄了 97 名 MOS4 的兒童。11 名兒童（11.3%）需要呼吸系統醫療幹預。在 2001 年記錄了 8 名兒童 MOS4,並且需要呼吸系統醫療幹預。比較新老指南下，調整的 MOS4 呼吸系統醫療幹預比值比為 0.30（95%置信區間：0.10-0.85）。呼吸系統醫療幹預得以下降的關鍵因素是地塞米松的使用和阿片類藥物用量減少。在 2002 年至 2006 年，MOS4 組中術中阿片類藥物的用量（以嗎啡的等效劑量表示）為 0.1 毫克/公斤（0.06-0.12 毫克/公斤），術後的嗎啡劑量為 0.02 毫克/公斤（0-0.07 毫克/公斤）。劑量均少於對照組的使用量，P 值<0.001。

**結論**：包括注射地塞米松和阿片類藥物應用減少的改變使需要呼吸系統醫療幹預的反復嚴重低氧血症兒童減少了 50%。

（姚敏敏譯 薛張綱校）

**BACKGROUND:** A high incidence of respiratory morbidity after adenotonsillectomy is reported in children with obstructive sleep apnea syndrome (OSAS). In an effort to decrease this morbidity, we implemented perioperative guidelines recommending an adjustment in the administration of opioids, dexamethasone, and atropine in children with OSAS who demonstrated recurrent episodes of profound hypoxemia during the perioperative sleep study.

**METHODS:** We performed a retrospective review and compared results with historic data from 2001. The primary outcome variable was a major respiratory medical intervention ($MMI_{Respiratory}$). The severity of OSAS was classified with the McGill Oximetry Scoring (MOS) system, and our focus was on those children demonstrating repetitive desaturation <80% (MOS4).

**RESULTS:** The medical records of 292 children who underwent adenotonsillectomy between October 2002 and February 2006 met the inclusion criteria and 97 had been assigned MOS4. Eleven children (11.3%) required an $MMI_{Respiratory}$. In 2001, 8 children (29.6%), assigned MOS4, required an $MMI_{Respiratory}$. Comparing the new and old guidelines, the adjusted odds ratio for $MMI_{Respiratory}$ in MOS4 was 0.30 (95% CI: 0.10–0.85). The key elements achieving this reduction in $MMI_{Respiratory}$ were dexamethasone administration and a reduced opioid dosage. In 2002 to 2006, the intraoperative opioid dose, expressed in morphine equivalents, administered to the MOS4 group was 0.10 $mg \cdot kg^{-1}$ (0.06–0.12 $mg \cdot kg^{-1}$), and the postoperative morphine dose was 0.02 $mg \cdot kg^{-1}$ (0–0.07 $mg \cdot kg^{-1}$). Both doses were lower than the ones administered to the concurrent comparison group, *P* values <0.001.

**CONCLUSIONS:** A change in practice that included a dexamethasone administration and a reduction in opioid administration to children with profound recurrent hypoxia reduced the incidence of $MMI_{Respiratory}$ by >50%.

## 圍術期心電圖和胸片在有可疑神經肌肉障礙患者中預測左心室功能不全的準確性

**Accuracy of preoperative electrocardiographic and chest radiographic screening for prediction of left ventricular dysfunction in patients with suspected neuromuscular disorders.**

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**背景**:我們試圖確定心電圖和胸片在麻醉前評估中接受肌肉活檢，可疑有神經肌接頭障礙的患者中預測左心室功能不全的可靠性。

**方法**：在這個回顧性研究中，255 例患者通過肌肉活檢前的麻醉前檢查，包括病史、體格檢查和實驗室檢查做出神經肌肉障礙的初步診斷。檢查包括心電圖，胸片，超聲心動圖，以評估潛在左心室功能不全相關的圍手術期風險。選用多因素 logistic 回歸分析確定是否可用胸片及心電圖獨立預測左心室功能不全。此外，接收機操作特性曲線分析在“金標準”超聲心動圖資料的基礎上來評估每個測試診斷的準確性和聯合使用胸片及心電圖在鑒別左心室功能不全的準確性。

**結果**：這項研究包括 255 例進行超聲心動圖檢查的患者，而在這些患者中，235 進行的胸片的檢查和 237 進行了心電圖檢查。 44 名患者被超聲心動圖診斷為左室功能不全（17.3%）。在 255 例患者中，經超聲心動圖診斷，有 24 人發現有輕度左室功能不全（9.4%）和 20 個中度至重度左室功能不全（7.8%）。根據超聲心動圖提供的左心室功能不全的診斷標準，我們發現，單獨使用胸片可以預測 37 例左心室功能不全，單獨使用心電圖可以預測 14%的病例，而兩者結合可以預測 81 %的病例。聯合使用心電圖和胸片提供最高的診斷準確率（0.95 的曲線下麵積，P<0.0001），在正常的左心室功能患者中鑒別中度至重度左心室功能不全。

**結論**：在有可疑神經肌肉疾病的患者中，胸片和心電圖獨立預測左心室功能不全與否的準確性較低。聯合使用兩種檢查在與性別年齡無關的可疑有神經肌肉障礙的患兒中，對心肌病變有相對較高的準確性，特別在具有中度到重度左心室功能不全的患者中。雖然我們的研究提示聯合使用心電圖和胸片可以作為一種可靠的方法來檢測左心室功能不全，這種方法無法區分心肌病的嚴重程度或可能存在的類型。因此，肌肉活檢前的超聲心動圖檢查必須仔細考慮懷疑疾病、心電圖和胸片結果、實驗室檢查、年齡、體格檢查和家族史。

（俞佳譯 薛張綱校）

**BACKGROUND**: We sought to determine the reliability of electrocardiography (ECG) and chest radiography (CXR) in predicting left ventricular (LV) dysfunction in patients with suspected neuromuscular disorders (NMDs) undergoing preanesthetic evaluation for muscle biopsy.

**METHODS**: In this retrospective study, 255 patients with a preliminary diagnosis of NMDs based on history, physical examination, and laboratory testing underwent preanesthetic screening before muscle biopsy. The screening included various

combinations of ECG, CXR, and transthoracic echocardiography (Echo) to assess perioperative risk associated with potentially undiagnosed LV dysfunction. Multivariate logistic regression analysis was applied to ascertain whether CXR and ECG were independently predictive of LV dysfunction. In addition, receiver-operating characteristic curve analysis was used to assess the diagnostic accuracy of each test and the combination of CXR and ECG in differentiating LV dysfunction from normal function based on Echo "gold standard" data.

**RESULTS**: The study consisted of 255 patients who had a transthoracic Echo, and among these patients, 235 had CXR and 237 had ECG. Forty-four patients were diagnosed by transthoracic Echo to have LV dysfunction (17.3%). Of the 255 patients in the study population, 24 were found to have mild LV dysfunction (9.4%) and 20 had moderate to severe LV dysfunction (7.8%) on Echo. With Echo providing the definitive standard for the diagnosis of LV dysfunction, we found that a CXR alone was predictive in 37% of cases of LV dysfunction, an ECG alone was predictive in 14% of cases, and the combination of both was predictive in 81% of cases. The combination of ECG and CXR test offered the highest diagnostic accuracy (area under the curve of 0.95, $P < 0.0001$) for differentiating moderate to severe LV dysfunction from normal LV function.

**CONCLUSIONS**: In patients with suspected neuromuscular disease, CXR and ECG provided low independent diagnostic prediction for the presence or absence of LV dysfunction. The combination of both tests can identify cardiomyopathy with relatively high accuracy in children with suspected NMDs independent of age and gender, particularly in patients with moderate to severe LV dysfunction. Although our findings suggest that combination ECG and CXR screening is a reliable means of detecting LV dysfunction, this approach fails to differentiate the severity or type of cardiomyopathy that may exist. Therefore, the decision to obtain a perioperative Echo before muscle biopsy should involve careful consideration of the disease suspected, ECG and CXR results, laboratory studies, patient age, physical examination, and family history.

艾司洛爾和蘭地洛爾，選擇性 β１的-腎上腺素受體拮抗劑，提供對脊髓缺血再灌注的保護作用。

**Esmolol and landiolol, selective beta1-adrenoreceptor antagonists, provide neuroprotection against spinal cord ischemia and reperfusion in rats.**

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**背景**：截癱是一種傷害性的和難以預料的併發症，偶爾由於胸外科和胸腹主動脈手術造成。由於超短效選擇性 β（1）-腎上腺素受體拮抗劑後提供腦缺血的神經保護作用，我們推測，它們也將改善大鼠短暫性腦缺血和再灌注損傷所致的脊髓損傷。

**方法**：雄性 SD 大鼠隨機分為一分為以下 4 組：生理鹽水（靜脈注射 0.9%鹽水輸注 0.5 毫升/小時，8 只），艾司洛爾（艾司洛爾 200 微克/公斤/分率，每組 8），蘭地洛爾（蘭地洛爾 50 微克/公斤/分鐘），或假外科手術（n = 6）。脊髓缺血開始前 30 分鐘輸注生理鹽水或藥物並在隨後的 24 小時持續灌注。脊髓缺血由持續 10 分鐘的主動脈內球囊近端動脈阻塞合併低血壓誘導。隨後脊髓再灌注 24 小時。脊髓損傷由再灌注 24 小時後的缺血性損傷由後肢活性減少指數評分和有活性的脊髓前角運動神經細胞數目共同評估。

**結果**：活性減少指數得分艾司洛爾和蘭地洛爾組顯著低於生理鹽水組（P <0.05）。脊髓組織病理學評估表明艾司洛爾和蘭地洛爾組的損害少於生理鹽水組（P <0.05）。

**結論**：這些資料表明，超短效選擇性 β（1）-腎上腺素受體拮抗劑可減少脊髓缺血再灌注大鼠模型的神經損傷。

（張玥琪譯，薛張綱校）

**BACKGROUND**: Paraplegia is a devastating and unpredictable complication occasionally resulting from surgery of the thoracic and thoracoabdominal aorta. Because ultrashort-acting selective beta(1)-adrenoreceptor antagonists provide neuroprotective effects after brain ischemia, we hypothesized that they would also ameliorate spinal cord injury after transient ischemia and reperfusion in rats.

**METHODS**: Male Sprague-Dawley rats were randomly assigned to one of the following 4 groups: saline (received IV infusion of 0.9% saline at a rate of 0.5 mL/h, n = 8), esmolol (esmolol 200 microg/kg/min, n = 8), landiolol (landiolol 50 microg/kg/min), or sham surgical (n = 6). Infusion of saline or drugs was initiated 30 minutes before spinal cord ischemia and continued for the subsequent 24-hour reperfusion. Spinal cord ischemia was induced by intraaortic balloon occlusion combined with proximal arterial hypotension for 10 minutes. The spinal cord was then reperfused for 24 hours. Ischemic injury was assessed in terms of the motor deficit index score of the hindlimb and the number of viable motor nerve cells in the anterior spinal cord at 24 hours after reperfusion.

**RESULTS**: The motor deficit index scores were significantly lower in the esmolol and landiolol groups compared with the saline group (P < 0.05). Histopathologic evaluation of the spinal cord showed less damage in the esmolol and landiolol groups than in the saline group (P < 0.05).

**CONCLUSIONS**: These data show that ultrashort-acting selective beta(1)-adrenoreceptor antagonists can reduce neurological injury in a rat model of spinal cord ischemia-reperfusion.

## 向腹壁下深穿支皮瓣間歇注射布比卡因減輕乳房再造術後疼痛的報告

**Brief report: improved pain relief using intermittent bupivacaine injections at the donor site after breast reconstruction with deep inferior epigastric perforator flap.**

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**背景**：運用腹壁下深穿支皮瓣的術式常引起術後皮瓣部位的疼痛，需阿片類藥物進行治療。
**方法**：本研究是一項雙盲、對照研究，試驗組和對照組各 20 例。我們在術後通過預留在皮瓣部位的細管向試驗組患者每隔三個小時注射 2.5 mg/mL 的布比卡因 20 mL，持續 72 小時來檢驗其鎮痛效果。
**結果**：試驗組患者在安靜和咳嗽時，疼痛均顯著減輕。對照組患者在觀察的 72 小時內均需要多於 2 到 3 次的阿片類藥物。兩組患者術後噁心的發生率和止吐藥的用量無差異。
**結論**：我們推斷向皮瓣部位間歇注射布比卡因克顯著減輕術後該部位的疼痛，同時應備好急救藥物。
（張釗譯 薛張綱校）

**BACKGROUND**: Deep inferior epigastric perforator flap surgery usually results in postoperative pain from the donor site requiring opioids.
**METHOD**: We examined the effect of bupivacaine 2.5 mg/mL, 20 mL given every third hour for 72 hours postoperatively through 2 thin catheters placed on the donor site in a double-blind placebo-controlled study consisting of 2 x 20 patients.
**RESULTS**: The bupivacaine group had significantly reduced pain at rest and during coughing. The placebo group needed 2 to 3 times more opioids in the 72-hour observation period. No difference was seen in the frequency of nausea or the consumption of antiemetic drugs.
**CONCLUSION**: We conclude that intermittent delivery of bupivacaine at the abdominal donor site significantly reduces the postoperative pain and need for narcotic rescue medication.

## 新福林抑制大鼠彌散性傷害抑制性控制的疼痛調節

**Phenylephrine Suppresses the Pain Modulation of Diffuse Noxious Inhibitory Control in Rats**

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**背景**：彌散性傷害抑制性控制(DNIC)是指廣範而動態的神經元為何通過中樞神經系統被異位元興奮遠離感受野身體部位的傷害性刺激選擇性強烈抑制的一種現象。以往的研究表明全身性給予一種 α1 腎上腺受體激動劑新福林可阻斷 DNIC。我們假設下行抑制通路介導 DNIC 的機制，並且 DNIC 神經網路環存在於腦幹中部一個較以往假定的更加接近嘴部的部位，可能位於中縫大核。此項研究的目的是確定 DNIC 是否被直接在中縫大核旁給予的新福林調節。

**方法**：實驗在麻醉的雄性 SD 大鼠上實施。為了向中縫大核旁注射不同的藥物，根據 Paxinos-Watso 圖譜將一根 33 號導管尖端置入中縫大核旁區域。使用單個矩形波電刺激刺激左後爪的腳趾。在尾巴浸入 50° C 熱水帶來的傷害缺失和存在時從股二頭肌記錄同側腓腸神經的感受野,其中包括電刺激引出的 C-纖維反射性反應。把從記錄的肌電圖計算出的 DNIC 效果作為抑制率。0.05 μL 鹽水和 0.05 μg/0.05 μL 新福林通過導管顯微注射入中縫大核旁。同樣的方法記錄肌電圖描記的活動所誘發的 C-纖維反射。注藥前後比較 C-纖維的抑制率。同種藥物組之間使用成對 t 檢驗進行統計比較。不同藥物組之間使用單因素方差分析和 Bonferroni 多重比較法進行統計分析。所有實驗結束時，用電流燒灼導管與組織接觸的末端來定位藥物注射的位置。取出大腦，冠狀面切片，蘇木精和伊紅染色。

**結果**：在中縫大核旁注射新福林後傷害性熱刺激（DNIC）抑制的 C-纖維反射明顯被阻滯。

**結論**：中縫大核旁直接注射新福林可抑制 DNIC，從而影響和調節內部疼痛抑制系統。這些結果表明中縫大核可能涉及 DNIC 的調節。

（朱蘭芳譯，薛張綱校）

**BACKGROUND:** Diffuse noxious inhibitory control (DNIC) is a phenomenon whereby wide dynamic range neurons are selectively and powerfully inhibited through the central nervous system by noxious stimuli heterotopically applied to a body area distant from their excitatory receptive fields. Previous work has shown that systemic administration of an α1-adrenoceptor agonist, phenylephrine (PE), blocked the DNIC. We hypothesized that descending inhibitory pathways mediate the DNIC mechanism and that the neural network of the DNIC loop exists in the middle brainstem, likely in a more rostral part than formerly assumed, possibly the nucleus raphe magnus (RMg). The aim of this study was to determine whether DNIC is directly modulated by PE when administered close to the RMg.

**METHODS:** The experiments were performed on anesthetized male Sprague-Dawley rats. For administration of different drugs close to the RMg, the tip of a 33-gauge cannula was placed into an area close to the RMg as determined using the atlas of Paxinos and Watson. Single square-wave electrical stimuli were applied to the digits of the left hindpaw. The C-fiber reflex response elicited by electrical stimulation within the receptive field of the ipsilateral sural nerve was recorded from the biceps femoris muscle in the absence and presence of noxious tail immersion in warm water at 50°C. The DNIC effect was calculated from a recorded electromyogram as the “inhibition rate.” Saline (0.05 μL) or PE (0.05 μg/0.05 μL) was microinjected close to the RMg through the cannula. The C-fiber reflex evoked by electromyographic activity was

recorded the same way. The inhibition rate of the C-fiber reflex was compared before and after administration of drugs. A paired *t* test was used for statistical comparison between same drug administration groups, and 1-way analysis of variance and Bonferroni multiple comparison were used for statistical analysis between different drugs. At the end of all experiments, the tissue-contacting end of the cannula tip was cauterized with an electric current to localize the drug administration site. The brain was removed, sliced in coronal sections, and stained with hematoxylin and eosin.
**RESULTS:** The C-fiber reflex inhibited by noxious thermal stimuli (DNIC) was significantly blocked after the injection of PE close to the RMg.
**CONCLUSION:** Direct administration of PE close to the RMg inhibited DNIC, thereby affecting and modulating the intrinsic pain inhibition system. These findings suggest that the RMg may be involved in the regulation of DNIC.

## 新的超聲引導下行局麻的學習模型：不易腐爛的物品製成的產品

**New Teaching Model for Practicing Ultrasound-Guided Regional Anesthesia Techniques: No Perishable Food Products!**

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**背景**：有一個關於超聲引導下局部麻醉的學習曲線。通過模擬模型可以加快掌握各種超聲引導下行局麻操作的技能。然而，超聲引導下局部麻醉的商業模型太昂貴或無法即時獲得。 利用火雞乳房或豆腐製成模型由於是由易腐食品製成，有感染的風險。我們描述了一個便宜的、使用不易腐爛的在手術室可得的材料製成的模型。
**方法**：所需材料包括 1 個乾淨的 500 毫升的靜脈輸液袋，一瓶 Premisorb（TYCO 醫療集團，Mansfield, MA），以及一塊修剪為直徑約 0.3 釐米、長 5 釐米長的手術室中可得的泡沫墊。 在靜脈輸液袋中加入自來水，從靜脈輸液袋出口處加入泡沫材料，三分之一瓶 Premisorb（約 15 克）。 該瓶子的出口用橡膠瓶塞密封。
**結果**：Premisorb，一種常用的手術室吸引器罐中沖洗液或血液的凝固劑，在靜脈輸液袋中產生凝膠狀物質。在輸液袋中加入泡沫物質可以產生相對高回聲目標。這種在輸液袋中的凝膠樣物質可以密封由於多次穿刺產生的孔並出現的細小洩漏。半透明的凝膠性質使學員直觀的觀察到目標及和超聲影像。
**結論**：我們描述的這個模型是價格低廉的，製作材料在手術室可得並且容易製造，還具有不易腐爛、便於攜帶和可重複使用的優點。
（陳珺珺譯 薛張綱校）

**BACKGROUND:** There is a pronounced learning curve for the technique of ultrasound-guided regional anesthesia. Practicing with a simulator model has been shown to speed the acquisition of these skills for various ultrasound-guided procedures. However, commercial models for ultrasound-guided regional anesthesia may be too costly or not readily available. Models using turkey breasts or tofu blocks have the disadvantage of

containing perishable food products that can be a source for infection. We describe an alternative inexpensive model that is made from nonperishable components readily available in the operating room.

**METHODS:** The materials required include 1 clean used 500-mL bag of IV fluids, a bottle of Premisorb® (TYCO Healthcare Group, Mansfield, MA), and a piece of foam material approximately 0.3 cm in diameter and 5 cm in length trimmed from operating room foam pads. After filling the IV bag with tap water and inserting the foam into the IV bag from the outlet port of the IV bag, one-third of a bottle of Premisorb (approximately 15 g) is poured into the IV bag. The outlet port of the bag is then sealed by taping the rubber stopper that originally came with the bag.

**RESULTS:** Premisorb, a solidifying agent frequently used to absorb irrigating fluids or blood in operating room suction canisters, produces a gel-like material in the IV bag. The foam inserted into the bag creates a relatively hyperechoic target. This gel-like substance in the bag will seal the holes created after multiple practice needle insertions, resulting in minimal leakage. The semitransparent nature of the gel allows the trainee to visualize the target directly and on the ultrasound screen.

**CONCLUSION:** The model we describe is inexpensive and easy to make from materials readily available in the operating room with the advantages of being nonperishable, easy to carry, and reusable.