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在一個鄉村眼科營地深局部和表面結膜下聯合麻醉用於囊外白內障摘除術

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Anesth Analg 2009 109: 2025-2027.

橈動脈穿刺置管：最新的解剖學和生理學研究

Radial Artery Cannulation: A Comprehensive Review of Recent Anatomic and Physiologic Investigations

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.Anesth Analg 2009 109: 1763-1781.

解剖位置容易到達、容易置管、併發症少，以上種種因素使得橈動脈成為置管的最佳選擇。橈動脈置管是一項相對安全的操作，缺血併發症只有 0.09%。雖然它的解剖在前臂和手有變異性，但是大部分病人其並行血流足以補償橈動脈血栓的形成。橈動脈可作為冠狀動脈旁路移植術的管道，在手部整形外科中有獨特作用以及其可作為心臟導管的置入點，這些都為我們對橈動脈旁路血流和橈動脈操作器械提供了新的視角。改良的 Allen's 試驗已經成為評估尺動脈旁路血流是否充分的最常用的臨床方法，儘管它對預測橈動脈閉塞的臨床證據尚缺乏。超聲多普勒可用來評估手部旁路血流灌注以此分層分析由置管引起的潛在的缺血性損傷。有限的研究表明用肝素沖洗橈動脈導管是有利的，但僅僅是對於長時程監測的病人（>24h）。對於橈動脈置管引起的缺血性併發症，保守治療和外科干預治療效果相似。有限的臨床經驗表明超聲引導橈動脈穿刺能提高置管的成功率，這和其能減少穿刺有關。在前瞻性研究中並未證實這種技術是否能減少併發症。尺動脈作為穿刺置管的備選方法的安全性有待進一步研究，因為尺神經比較靠近尺動脈，損傷的潛在風險較高。
（李潺 譯 陳傑 校）

Consistent anatomic accessibility, ease of cannulation, and a low rate of complications have made the radial artery the preferred site for arterial cannulation. Radial artery catheterization is a relatively safe procedure with an incidence of permanent ischemic complications of 0.09%. Although its anatomy in the forearm and the hand is variable, adequate collateral flow in the event of radial artery thrombosis is present in most patients. Harvesting of the radial artery as a conduit for coronary artery bypass grafting, advances in plastic and reconstructive surgery of the hand, and its use as an entry site for cardiac catheterization has provided new insight into the collateral blood flow to the hand and the impact of radial arterial instrumentation. The Modified Allen's Test has been the most frequently used method to clinically assess adequacy of ulnar artery collateral flow despite the lack of evidence that it can predict ischemic complications in the setting of radial artery occlusion. Doppler ultrasound can be used to evaluate collateral hand perfusion in an effort to stratify risk of potential ischemic injury from cannulation. Limited research has demonstrated a beneficial effect of heparinized flush solutions on arterial catheter patency but only in patients with prolonged monitoring (>24 h). Conservative management may be equally as effective as surgical intervention in treating ischemic complications resulting from radial artery cannulation. Limited clinical experience with the ultrasound-guided arterial cannulation method suggests that this technique is associated with increased success of cannulation with fewer attempts. Whether use of the latter technique is associated with a decrease in complications has not yet been verified in prospective studies. Research is needed to assess the safety of using the ulnar artery as an alternative to radial artery cannulation because the proximity and attachments of the ulnar artery to the ulnar nerve may potentially expose it to a higher risk of injury.

對接受恥骨切骨術患兒應用連續髂筋膜腔隙阻滯（FIC）較阿片類有更好的術後鎮痛效果且副作用少

Incisional Continuous Fascia Iliaca Block Provides More Effective Pain Relief and Fewer Side Effects than Opioids After Pelvic Osteotomy in Children

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Anesth Analg 2009 109: 1799-1803.

背景：靜脈注射阿片類常用于兒童矯形術後的鎮痛，但常伴有副作用，如呼吸抑制，嘔吐，嗜睡，尿瀦留。為驗證連續髂筋膜腔隙阻滯（FIC）是否較靜注嗎啡術後鎮痛效果更好且副作用少，作者進行了一項前瞻性隨機雙盲試驗以評估這兩種方法。

方法：選取 30 名 3 至 6 歲接受恥骨截骨術的患兒（ASA I - Ⅱ）入組。這些患兒隨機分配至 M 組：靜注嗎啡、髂筋膜腔隙使用安慰劑（生理鹽水）或 R 組：靜注安慰劑（生理鹽水）、髂筋膜腔隙使用羅呱卡因。所有患兒麻醉方式採用七氟醚和芬太尼的氣靜全麻。外科醫生術中將 FIC 導管置入。手術結束時所有患兒隨機靜注一定劑量的嗎啡（M 組），或 FIC 導管推注 0.75%羅呱卡因。術後，M 組靜注 20 $\mu g \cdot kg^{-1} \cdot h^{-1}$ 嗎啡；R 組經 FIC 導管中推注 0.2%羅呱卡因 0.1 $mL \cdot kg^{-1} \cdot h^{-1}$ 鎮痛。兩個組生理鹽水由另一獨立途徑給予。對所有患兒進行評估疼痛，嗜睡程度，術後首次進食時間，及術後的 48 小時內的副作用。在此期間，所有的患兒進行了導尿。

結果：完成此項調研的有 28 名患兒。在麻醉恢復室中，M 組患兒疼痛得分較高。這些患兒在此期間也更嗜睡。嘔吐的發生率兩組間沒有顯著差異，但 R 組患兒術後首次進食時間明顯早於 M 組。一項回顧性研究發現推注羅呱卡因患者尿瀦留發生率為 4.7%，而推注嗎啡患者尿瀦留發生率為 39%。

結論：對接受恥骨切骨術患兒應用連續髂筋膜腔隙阻滯（FIC）較靜注嗎啡提供更好的術後鎮痛效果，且嗜睡副作用少，術後食欲恢復更好。

（陳毓雯 譯 陳傑 校）

BACKGROUND: Intravenous opioid therapy is frequently used for postoperative pain management in children after orthopedic surgery but causes side effects such as respiratory depression, vomiting, sedation, and urinary retention. To investigate whether a continuous incisional fascia iliaca compartment (FIC) block provides more effective postoperative pain relief with fewer side effects than IV morphine, we performed a prospective, double-blind, randomized study to compare both techniques.

METHODS: Thirty children (ASA physical status I–II) aged 3 mo to 6 yr undergoing a pelvic osteotomy were included in the study. The children were randomized for either morphine IV and placebo (saline) via a FIC catheter (Group M) or placebo (saline) IV and ropivacaine via a FIC catheter (Group R). All patients received general anesthesia using inhaled sevoflurane and IV fentanyl. Perioperatively, a FIC catheter was placed by the surgeon. All patients received either a bolus dose of morphine IV (Group M) or ropivacaine 0.75% via the FIC catheter (Group R) at the end of surgery. Postoperatively, Group M received morphine IV 20 $\mu g \cdot kg^{-1} \cdot h^{-1}$ and Group R ropivacaine 0.2% 0.1 $mL \cdot kg^{-1} \cdot h^{-1}$ via the FIC catheter. In both groups, saline was

administered along the other route. All children were assessed for pain, sedation, time until first oral intake, and adverse effects for 48 h postoperatively. During this period, all children had a urinary catheter.
RESULTS: The study was completed by 28 children. In the anesthetic recovery room, children in Group M had significantly higher pain scores. These children were also significantly more sedated during the study period. The incidence of vomiting did not differ between the groups; however, children in Group R had first oral intake significantly earlier than Group M. A local retrospective study revealed an incidence of urinary retention of 4.7% in the ropivacaine-treated patients and 39% in the morphine-treated patients.
CONCLUSIONS: Continuous incisional FIC block provides excellent postoperative pain relief, less sedation, and better return of appetite than morphine IV after pelvic osteotomy in children.

γ-氨基丁酸 A 型受體（$GABA_A$-R_s）α4 亞單位敲除的小鼠能夠抵抗異氟烷產生的遺忘性作用

Gamma-Aminobutyric Acid Type A Receptor Alpha 4 Subunit Knockout Mice Are Resistant to the Amnestic Effect of Isoflurane

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背景：全麻產生多項終點效應，包括制動、催眠、鎮靜以及遺忘。緊張性抑制通過 $GABA_A$-R_s的作用調節著行為效應，並在其中起了主要作用。這些行為效應同時又可被低濃度的麻醉藥所抑制（比如催眠和遺忘）。含α4 亞單位的 $GABA_A$-R_s在海馬和丘腦中的濃度較高，一旦其結合了δ亞單位後，這些受體就可以調節緊張性抑制，而這種調節作用對於低濃度的異氟烷是很敏感的。
方法:在這項研究中，作者使用敲除了 $GABA_A$α4 受體的小鼠來評估異氟烷產生的制動、催眠和遺忘效應中 $GABA_A$-R_s的α4 亞單位在上述效應中的作用。敲除小鼠和它們的野生型對照組都進行了 3 項行為測試：條件性恐懼（用來評估遺忘），翻正反射的消失（用來評估催眠），以及使 50%個體對於有害刺激無體動的吸入麻醉的最低肺泡有效濃度（用來評估制動）。
結果：α4 亞單位遺傳失活減少了異氟烷的遺忘效應，對於翻正反射消失的影響最小，而對於制動性沒有影響。
結論：這些結果支持了這樣一種假設：行為動作的不同部位調節著不同的麻醉效應，同時也說明了另一點，包含α4 亞單位的 $GABA_A$-R_s在異氟烷產生的遺忘效應中是起著重要調節作用的，而這種遺忘效應主要是針對海馬依賴性的陳述性記憶而言的。
（張婷 譯 陳傑 校）

BACKGROUND: General anesthesia produces multiple end points including immobility, hypnosis, sedation, and amnesia. Tonic inhibition via γ-aminobutyric acid type A receptors ($GABA_A$-Rs) may play a role in mediating behavioral end points that are suppressed by low concentrations of anesthetics (e.g., hypnosis and amnesia). $GABA_A$-Rs containing the α4 subunit are highly concentrated in the hippocampus and thalamus, and when combined with δsubunits they mediate tonic inhibition, which is sensitive to low concentrations of isoflurane.
METHODS: In this study, we used a $GABA_A$ α4 receptor knockout mouse line to evaluate the contribution of α4-containing $GABA_A$-Rs to the effects of immobility, hypnosis, and amnesia produced by isoflurane. Knockout mice and their wild-type counterparts were assessed on 3 behavioral tests: conditional fear (to assess amnesia), loss of righting reflex (to assess hypnosis), and the minimum alveolar concentration of inhaled anesthetic necessary to produce immobility in response to noxious stimulation in 50% of subjects (to assess immobility).
RESULTS: Genetic inactivation of the α4 subunit reduced the amnestic effect of isoflurane, minimally affected loss of righting reflex, and had no effect on immobility.
CONCLUSIONS: These results lend support to the hypothesis that different sites of action mediate different anesthetic end points and suggest that α4-containing $GABA_A$-Rs are important mediators of the amnestic effect of isoflurane on hippocampal-dependent declarative memory.

用可視聽診器檢測氣管導管的位置

A Visual Stethoscope to Detect the Position of the Tracheal Tube

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背景：氣管導管插入支氣管可以產生單側呼吸音。作者製作了可視聽診器，該可視聽診器能即時將聲信號快速轉換為三維（頻率－波幅－時間）彩色圖像並能在個人電腦顯示且能獨立處理兩種獨立的聲音信號。本研究目的是評估可視聽診器是否和聽診一樣能監測支氣管插管。
方法：全身麻醉誘導後，氣管導管插入氣管，用纖支鏡測量切牙到氣管隆突之間的距離，一名麻醉醫生把氣管導管從氣管向支氣管推進，另外一名麻醉醫生聽診呼吸音，以探測氣管導管前進每 1cm 雙側呼吸音的變化，同時在胸的左邊和右邊用心前區聽診器記錄兩側呼吸音。然後一名麻醉醫生將可視聽診器呼吸音輸入個人電腦並處理可視呼吸音，檢查雙側呼吸音的變化或消失，比較兩者的差異。
結果：研究中共有 30 名患者。當聽到不規則的呼吸音，氣管導管的尖端位於隆突下支氣管 0.6 ± 1.2 cm。用可視的聽診器時可視呼吸音的波形出現微小變化時導管位於隆突氣管側 0.4 ± 0.8 cm。當聽到單側呼吸音時，導管位於隆突側面支氣管 2.6 ± 1.2 cm ，而用可視聽診器確定單側呼吸音時導管位於隆突側支氣管 2.6 ± 1.2 cm ，兩者差異不顯著。

結論：在氣管導管前進的過程中，用可視聽診器捕捉的可視呼吸音波形變化早於用聽診器探測的呼吸音變化。在兩組中，當支氣管導管的頭端前進超過隆突，雙側呼吸音消失。
（劉世文 譯 陳傑 校）

BACKGROUND: Advancing a tracheal tube into the bronchus produces unilateral breath sounds. We created a Visual Stethoscope that allows real-time fast Fourier transformation of the sound signal and 3-dimensional (frequency-amplitude-time) color rendering of the results on a personal computer with simultaneous processing of 2 individual sound signals. The aim of this study was to evaluate whether the Visual Stethoscope can detect bronchial intubation in comparison with auscultation.
METHODS: After induction of general anesthesia, the trachea was intubated with a tracheal tube. The distance from the incisors to the carina was measured using a fiberoptic bronchoscope. While the anesthesiologist advanced the tracheal tube from the trachea to the bronchus, another anesthesiologist auscultated breath sounds to detect changes of the breath sounds and/or disappearance of bilateral breath sounds for every 1 cm that the tracheal tube was advanced. Two precordial stethoscopes placed at the left and right sides of the chest were used to record breath sounds simultaneously. Subsequently, at a later date, we randomly entered the recorded breath sounds into the Visual Stethoscope. The same anesthesiologist observed the visualized breath sounds on the personal computer screen processed by the Visual Stethoscope to examine changes of breath sounds and/or disappearance of bilateral breath sound. We compared the decision made based on auscultation with that made based on the results of the visualized breath sounds using the Visual Stethoscope.
RESULTS: Thirty patients were enrolled in the study. When irregular breath sounds were auscultated, the tip of the tracheal tube was located at 0.6 ± 1.2 cm on the bronchial side of the carina. Using the Visual Stethoscope, when there were any changes of the shape of the visualized breath sound, the tube was located at 0.4 ± 0.8 cm on the tracheal side of the carina ($P < 0.01$). When unilateral breath sounds were auscultated, the tube was located at 2.6 ± 1.2 cm on the bronchial side of the carina. The tube was also located at 2.3 ± 1.0 cm on the bronchial side of the carina when a unilateral shape of visualized breath sounds was obtained using the Visual Stethoscope (not significant).
CONCLUSIONS: During advancement of the tracheal tube, alterations of the shape of the visualized breath sounds using the Visual Stethoscope appeared before the changes of the breath sounds were detected by auscultation. Bilateral breath sounds disappeared when the tip of the tracheal tube was advanced beyond the carina in both groups.

血糖可作為經尿道雙極電切手術時液體吸收的標誌

Glucose as a Marker of Fluid Absorption in Bipolar Transurethral Surgery

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背景：在過去，血清鈉濃度的降低已用於反映經尿道前列腺電切術（TURP）期間電解質灌注液的吸收量。在經尿道前列腺雙極電切術中使用的灌注液裡含有多種電解質，這導致了血清鈉濃度測定法不夠準確。在這項研究中，研究者調查了血糖是否可用於反映 TURP 過程中灌注液的吸收量。
方法：250例接受單極電切術的患者中測定血糖和血鈉濃度，術中使用1.5%甘氨酸或5%葡萄糖溶液作為膀胱灌洗液。10名志願者進行了葡萄糖動力學分析，這些志願者們用含1%葡萄糖的醋酸林格氏液為灌注液以20mL/kg 灌注30分鐘。這些資料再由電腦類比不同的吸收模式總結出血糖水平和灌注液管理之間的的關係圖。
結果：從統計學角度看，在以5%葡萄糖溶液為灌注液的 TURP 術中血清鈉的降低與血糖的升高之間存在反線性關係(r^2 = 0.80)。在灌注試驗中葡萄糖濃度從4.6（sd0.4）升高至8.3（0.9）mmol / L。無論哪種吸收模式，所有的類比分析表明，使用1升含1%葡萄糖的灌注液對應的術畢血糖水準的提高量為3.7（sd1.6）mmol /L，而2升產生的增加量為6.9（1.7）mmol / L。
結論：以1%葡萄糖為灌注液行經尿道前列腺雙極電切術術中，患者血糖濃度的增加與測定血鈉濃度的方法一樣可以作示蹤劑用來反映灌注液的吸收量。
（丁俊雲 譯 陳傑 校）

BACKGROUND: Historically, a reduced serum sodium concentration has been used to diagnose absorption of electrolyte-free irrigating fluid during transurethral resection of the prostate (TURP). In bipolar TURP, the irrigating solution contains electrolytes, thus invalidating the serum sodium method. In this study, we investigated whether glucose can be used to diagnose the absorption of irrigating fluid during TURP procedures.
METHODS: The serum glucose and sodium concentrations were measured in 250 patients undergoing monopolar TURP using either 1.5% glycine or 5% glucose for urinary bladder irrigation. The glucose kinetics was analyzed in 10 volunteers receiving a 30-min infusion of 20 mL/kg of acetated Ringer's solution with 1% glucose. These data were then used in computer simulations of different absorption patterns that were summarized in a nomogram for the relationship between the glucose level and administered fluid volume.
RESULTS: There was a statistically significant inverse linear relationship between the decrease in serum sodium and the increase in glucose levels after absorption of 5% glucose during TURP (r^2 = 0.80). The glucose concentration increased, from 4.6 (sd 0.4) to 8.3 (0.9) mmol/L, during the experimental infusions. Regardless of the absorption pattern, all simulations indicated that the uptake of 1 L of fluid containing 1% glucose corresponded to an increase in the glucose level of 3.7 (sd 1.6) mmol/L at the end of surgery, whereas 2 L yielded an increase of 6.9 (1.7) mmol/L.
CONCLUSIONS: In bipolar TURP, the addition of glucose to a concentration of 1% in the electrolyte-containing irrigation fluid can be used as a tracer of absorption that is comparable with measuring serum sodium after monopolar TURP.

困難面罩通氣

Difficult Mask Ventilation

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面罩通氣是氣道管理中最基本的技能。在此綜述中，研究者總結了有關面罩通氣困難（DMV）的知識。在文獻中有關 DMV 有各種不同的定義。缺乏確切的標準定義給研究 DMV 帶來一些困難，導致資料交流和對比的混亂。DMV 的發生與技術相關和/或氣道相關。通常，各種發病機制及這些因素相互作用並最終導致 DMV。DMV 的發生率差異很大（從 0.08% 到 15%），取決於其使用的標準定義。肥胖，年齡大於 55 歲，打鼾，缺牙，鬍子的存在，Mallampati 分級 III 或 IV 級，下頜前突試驗異常這些都是 DMV 的獨立的預測因素。因此，術前評估中應該認識到並記錄這些跡象。在嬰幼兒 DMV 更具挑戰性，因為他們出現低氧血症比成人快的多。最後，DMV 的患者發生氣管插管困難的機會更加頻繁。因此，臨床醫生面臨具有挑戰性的面罩通氣困難或者無效的時候，應該熟悉對此的糾正措施和管理方法。
（舒慧剛 譯 陳傑 校）

Mask ventilation is the most fundamental skill in airway management. In this review, we summarize the current knowledge about difficult mask ventilation (DMV) situations. Various definitions for DMV have been used in the literature. The lack of a precise standard definition creates a problem for studies on DMV and causes confusion in data communication and comparisons. DMV develops because of multiple factors that are technique related and/or airway related. Frequently, the pathogenesis involves a combination of these factors interacting to cause the final clinical picture. The reported incidence of DMV varies widely (from 0.08% to 15%) depending on the criteria used for its definition. Obesity, age older than 55 yr, history of snoring, lack of teeth, the presence of a beard, Mallampati Class III or IV, and abnormal mandibular protrusion test are all independent predictors of DMV. These signs should, therefore, be recognized and documented during the preoperative evaluation. DMV can be even more challenging in infants and children, because they develop hypoxemia much faster than adults. Finally, difficult tracheal intubation is more frequent in patients who experience DMV, and thus, clinicians should be familiar with the corrective measures and management options when faced with a challenging, difficult, or impossible mask ventilation situation.

緊急經皮氣道建立術的氣道損傷：對比環甲穿刺氣管插管

Airway Injury During Emergency Transcutaneous Airway Access: A Comparison at Cricothyroid and Tracheal Sites

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背景：在緊急情況下可能需要經環甲膜穿刺供氧（CTM），同樣在氣管插管困難患者中也可能需要此技術。在這項研究中，作者運用不同的氣道建立技術比較氣管插管與經環甲膜穿刺引起氣道損傷的差異。
方法：麻醉醫師運用 4 種氣道建立技術對離體豬氣管進行插管。技術 1）運用鋼絲導絲引導插管（WGT），2）套管引導（TT），3）套管針引導（NCT），4）氣管切開插管（ST）。參與者分別運用每一項技術進行環甲膜穿刺插管和氣管插管並進行損傷評估。
結果： 環甲膜穿刺插管的樣本損傷為 8/40；氣管插管的損傷為 27/40。在 TT 組和 ST 組中，氣管插管損傷均大於環甲膜穿刺插管($P = 0.02$)，在 NCT 組和

WGT 組並非如此。氣管插管中的損傷 ST 組 (9 of 10) = TT 組 (9 of 10) > WGT 組 (6 of 10) > NCT 組 (3 of 10) (*P* = 0.02,發生率最高與最低相比)。但不同組在環甲膜穿刺插管的氣道損傷中未見明顯差別。氣管插管的後期損傷發生高低排序為 TT 組 (9 of 10) = ST 組 (9 of 10) > WGT 組 (5 of 10) > NCT 組 (2 of 10) (*P* = 0.005, 發生率最高與最低相比)。 穿透傷發生高低排序為 ST 組(6 of 10) = TT 組 (6 of 10) > WGT 組(2 of 10) > NCT 組 (1 of 10) (*P* = 0.057, 發生率最高與最低相比)。在氣道側壁，淺表以及穿孔損傷的發病率沒有明顯差異。在氣管插管中環狀軟骨骨折發生更常見（(15 of 40 對比於 0 of 40, *P* < 0.001)，同時其發生率在插管技術間也有不同。在骨折的發生率依次為 ST 組（6 of 10）>WGT（10 of 5）>TT 組（4 of 10>NCT 組（0 0f 10）（P = 0.011，最高到最低）。

結論：氣管插管相較於環甲膜穿刺插管的氣道損傷及管腔受壓更為普遍。ST 和 TT 的氣道傷害發病率最高。緊急情況下建立氣道，環甲膜穿刺有定位困難的可能。

（葉樂 譯 陳傑 校）

BACKGROUND: Oxygenation via the cricothyroid membrane (CTM) may be required in emergencies, but inadvertent tracheal cannulation may occur. In this study, we compared airway injury between the tracheal and CTM sites using different techniques for airway access.

METHODS: Anesthesiologists performed 4 airway access techniques on excised porcine tracheas. The techniques were 1) wire-guided (WGT), 2) trocar (TT), 3) needle cannula (NCT), and 4) surgical—scalpel with endotracheal tube (ST). Participants performed each technique at both the CTM and tracheal sites. Specimens were assessed for injury.

RESULTS: Injury was observed in 8 of 40 and 27 of 40 specimens at the CTM and tracheal sites, respectively (*P* < 0.001). Injury was more frequent at the tracheal site compared with the CTM in both the TT and ST groups (*P* = 0.02) but not for the NCT and WGT. The rank order for any injury at the tracheal site was ST (9 of 10) = TT (9 of 10) > WGT (6 of 10) > NCT (3 of 10) (*P* = 0.02, highest versus lowest), whereas there was no difference in injury at the CTM. The rank order for posterior injury at the tracheal site was TT (9 of 10) = ST (9 of 10) > WGT (5 of 10) > NCT (2 of 10) (*P* = 0.005, highest versus lowest). The rank order for penetrating injury at the tracheal site was ST (6 of 10) = TT (6 of 10) > WGT (2 of 10) > NCT (1 of 10) (*P* = 0.057, highest versus lowest). There was no difference in the incidence of lateral, superficial, or perforating injuries among sites and techniques. Fractures were more common at the tracheal site (15 of 40 vs 0 of 40, *P* < 0.001) and differed by technique. The rank order of fracture incidence at the tracheal site was ST (6 of 10) > WGT (5 of 10) > TT (4 of 10) > NCT (0 of 10) (*P* = 0.011, highest to lowest). Compression of >50% was seen in 10 of 40 vs 28 of 40 (*P* < 0.001) specimens at the CTM and tracheal sites, respectively. The rank order of compression of >50% of airway lumen for both sites was TT > ST > WGT > NCT (*P* = 0.03, *P* < 0.001, CTM and tracheal sites, respectively, highest versus lowest).

CONCLUSION: Airway injury and luminal compression were more common at the tracheal site than at the CTM. The ST and TT were associated with the highest incidence of injury. This has implications for emergency airway access in cases in which it may be difficult to accurately identify the CTM.

連續靜注瑞芬太尼在分娩鎮痛中的療效與安全性：205 位產婦的開放性研究

The Efficacy and Safety of Continuous Intravenous Administration of Remifentanil for Birth Pain Relief: An Open Study of 205 Parturients

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在這一觀測研究中，作者評估了瑞芬太尼在205例產婦中的療效及安全性。研究中瑞芬太尼採用持續輸注。最初輸注速度為0.025 μg · kg^{-1} · min^{-1}，並逐步增加，最高為0.15μg · kg^{-1} · min^{-1}。記錄產婦疼痛，產婦和胎兒的其他變數，副作用及滿意度。開始輸液前平均（±標準差）視覺類比評分為9.4 ± 1.2cm，5min 後下降至5.1 ± 0.4cm 和30min 後為3.6 ± 1.5cm。產婦副作用很小，並無胎兒或新生兒副作用記錄。
（張磊 譯 陳傑 校）

In an observational study, we prospectively evaluated the efficacy and safety of remifentanil in 205 parturients. Remifentanil was administered as a continuous infusion. The initial infusion of 0.025 μg · kg^{-1} · min^{-1} was increased in a stepwise manner to a maximum dose of 0.15 μg · kg^{-1} · min^{-1}. Maternal pain, other maternal and fetal variables, side effects, and satisfaction were recorded. The mean (±sd) visual analog score before the start of the infusion was 9.4 ± 1.2 cm and decreased to 5.1 ± 0.4 cm after 5 min and 3.6 ± 1.5 cm after 30 min. The maternal side effects were minimal and no fetal or neonatal side effects were noted.

9. 羥基廿碳四烯酸大在大腦小動脈收縮和異丙酚抑制作用中的機制

The Role of 20-Hydroxyeicosatetraenoic Acid in Cerebral Arteriolar Constriction and the Inhibitory Effect of Propofol

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Anesth Analg 2009 109: 1935-1942.

背景：作者開展了這項實驗來研究羥基廿碳四烯酸(20-HETE)是否通過超氧化物引起腦實質小動脈收縮以及異丙酚是否能抑制此收縮。
方法：用電腦輔助顯微鏡來檢測電刺激和羥基廿碳四烯酸對大鼠大腦切片的影響。部分試驗中加入鈉通道阻滯劑河豚毒素，或 20-HETE 抑制劑 HET0016，或超氧化物清除劑，或鈦試劑，NADPH 氧化酶抑制劑 DPI 和 gp91ds-tat 或異丙酚。通過螢光探針和細胞色素 c、過氧化氫酶系統的減少來分別評估有無應用上述試劑的大腦切片中超氧化物產生率。
結果：電刺激誘發腦實質小動脈的收縮，可被河豚毒素， HET0016，鈦試劑，NADPH 氧化酶抑制劑（DPI）所阻斷。羥基廿碳四烯酸(10–8–10–6 mol/L)導致

的動脈收縮可被鈦鐵試劑 NADPH 氧化酶抑制劑（DPI）抑制。異丙酚可減少電刺激和羥基廿碳四烯酸引起的動脈收縮。在大腦切片中顯示鈦鐵試劑，嵌合肽抑制物（gp91ds-tat）和異丙酚能還原羥基廿碳四烯酸誘導形成的超氧化物。然而，異丙酚不能改變未用上述試劑的大腦切片中超氧化物的產生率。
結論：無論是神經源性的還是外源性的羥基廿碳四烯酸都能通過 NADPH 氧化酶啟動超氧化物引起腦實質動脈收縮。異丙酚可能通過抑制 NADPH 氧化酶來阻止此收縮，而不是通過其清除超氧化物來抑制收縮。
（楊秋娟 譯 陳傑 校）

BACKGROUND: We conducted this study to examine, in cerebral parenchymal arterioles, whether 20-hydroxyeicosatetraenoic acid (20-HETE) induces constrictor responses via superoxide and whether propofol reduces this constriction.
METHODS: Electrical field stimulation or 20-HETE was applied to rat brain slices monitored by computer-assisted microscopy. In some experiments, a Na^+ channel antagonist tetrodotoxin, a 20-HETE synthesis inhibitor HET0016, a superoxide scavenger, Tiron, nicotinamide adenine dinucleotide phosphate (NADPH) oxidase inhibitors diphenyleneiodonium (DPI) and gp91ds-tat, or propofol was added. The superoxide level in the brain slice and the production rate in the absence of slices were evaluated by dihydroethidium fluorescence or cytochrome *c* reduction with a superoxide-generating system, respectively.
RESULTS: Electrical stimulation induced constriction of the cerebral parenchymal arteriole, whereas this response was abolished by tetrodotoxin, HET0016, Tiron, or DPI. 20-HETE (10^{-8}–10^{-6} mol/L) produced arteriolar constriction, which was inhibited by Tiron or DPI. Propofol reduced the constriction induced by electrical stimulation or 20-HETE. 20-HETE induced superoxide production in the brain slice, which was reduced by Tiron, gp91ds-tat, or propofol. However, propofol did not alter the superoxide production rate in the absence of brain slices.
CONCLUSIONS: Either neuronal transmission-dependent or exogenous 20-HETE seems to induce cerebral parenchymal arteriolar constriction via superoxide production resulting from NADPH oxidase activation. Propofol is likely to prevent this constriction via inhibition of NADPH oxidase, but not by its scavenging effect on superoxide.

經皮尼古丁貼劑不影響吸煙患者術後疼痛處理：劑量範圍的初步研究

A Transdermal Nicotine Patch Is Not Effective for Postoperative Pain Management in Smokers: A Pilot Dose-Ranging Study

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Anesth Analg 2009 109: 1987-1991.

背景：動物模型中尼古丁已被證實有抗傷害作用。對於人類的鎮痛作用已進行了研究，但結果較為複雜。其中一個因素是慢性尼古丁暴露在吸煙人群和二手煙人群存在分歧。在這項研究中，作者研究尼古丁貼劑對吸煙患者的術後鎮痛的影響。先前已有非吸煙患者中研究。
方法：28 例進行腹部或盆腔手術的病人中進行了一項隨機、雙盲、前瞻性、有安慰劑對照的試驗，這些病人都需要自控鎮痛及住院一晚。麻醉誘導前，使用一尼古丁貼劑（0，5，10，或 15mg）。主要結果變數為術後疼痛報告，在第一

個小時，及未來 5 天使用標準的數位等級量表。次要結果的變數是止痛藥的使用，血流動力學值，噁心和鎮靜。
結果：在手術後第一個小時使用尼古丁貼劑的患者較安慰劑患者有更高的疼痛評分（P<0.01，平均數字評定量表增值= 0.67）。而在隨後的 5 天中兩組無差異（P>0.05 ）。沒有明顯的劑量效應。術後第一個小時舒張壓，安慰劑組高於尼古丁治療組（P<0.01，平均增值= 11 mm Hg）。在噁心或鎮靜方面無差異。
結論：吸煙患者應用尼古丁貼劑（5-15mg）未能減輕術後疼痛或減少阿片類藥物使用。
（張蕾 譯 陳傑 校）

BACKGROUND: Nicotine has an antinociceptive effect in animal models. The analgesic effect in humans has been examined, but studies have had mixed results. A proposed etiology is variability in chronic nicotine exposure because of differences in tobacco smoking rates and second-hand smoke exposure. In this study, we examined the postoperative analgesic effect of a transdermal nicotine patch in smokers in a parallel design to a previous study in nonsmokers.
METHODS: We conducted a randomized, double-blind, prospective, placebo-controlled trial of 28 patients undergoing abdominal or pelvic surgery who required patient-controlled analgesia and an overnight hospital stay. Before anesthetic induction, a transdermal nicotine patch was applied (0, 5, 10, or 15 mg). The primary outcome variable was postoperative pain reported over the first hour and over the next 5 days using a standard numerical rating scale. Secondary outcome variables were pain medication use, hemodynamic values, nausea, and sedation.
RESULTS: Patients treated with nicotine reported higher pain scores than those treated with placebo over the first hour after surgery ($P < 0.01$, average numerical rating scale increase = 0.67) and there was no difference between groups in the subsequent 5 days ($P > 0.05$). There was no significant dose effect. Diastolic blood pressure in the first hour was higher in the placebo group compared with the nicotine-treated group ($P < 0.01$, average increase = 11 mm Hg). There was no difference in nausea or sedation.
CONCLUSIONS: Transdermal nicotine, 5–15 mg, failed to relieve postoperative pain or reduce opioid use in smokers.

單次肌間溝法臂叢阻滯後頸淺叢神經病變

Superficial Cervical Plexus Neuropathy After Single-Injection Interscalene Brachial Plexus Block

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Anesth Analg 2009 109: 2008-2011.

背景：使用改良外側徑路肌間溝臂叢神經阻滯法（ISB）能為肩部手術病人提供確切的麻醉與鎮痛。考慮到注射部位的神經解剖，頸淺叢有損傷的風險。作者評估了頸淺叢神經病變的發生率和病變特徵。
方法：在一年之間，作者研究了連續 273 名接受單次 ISB 行肩部及上臂手術患者。在術前、術後 24 小時對這些病人進行與頸淺叢損傷相關的症狀的檢查，並在術後 31 天進行電話聯繫。有症狀的病人術後再接受為期 6 月的電話聯繫。

結果：肩部手術術後 24 小時，21 位患者（7.7%）表現出與頸淺叢損傷一致的症狀。包括與頸淺叢 1-4 皮支對應的感覺減退。5 位患者（1.8%）稱症狀持續超過 31 天。所有症狀均在 6 月後得以緩解。
結論：使用改良外側徑路 ISB 後（發生）頸淺叢神經病變並不罕見，應預先與病人討論這種可能性（告知風險）。
（鄒巧群 譯 陳傑 校）

BACKGROUND: Interscalene brachial plexus block (ISB) using the modified lateral approach provides a well-established method of anesthesia and analgesia for patients undergoing shoulder surgery. Considering the neural anatomy at the site of injection, the superficial cervical plexus may be at risk of injury. We evaluated the incidence and characteristics of superficial cervical plexus neuropathy.
METHODS: During a 1-yr period, 273 consecutive patients requiring single-injection ISB for shoulder or proximal arm surgery were studied. Patients were examined for symptoms compatible with superficial cervical plexus injury before surgery, 24 h postoperatively, and contacted by telephone 31 days after surgery. Symptomatic patients received an additional phone call 6 mo after surgery.
RESULTS: Twenty-four hours after shoulder surgery, 21 patients (7.7%) showed symptoms consistent with superficial cervical plexus neuropathy. Symptoms consisted of hypesthesia in 1–4 cutaneous branches of the cervical plexus. Five patients (1.8%) reported symptoms that lasted for >31 days. All symptoms had entirely resolved after 6 mo.
CONCLUSIONS: Superficial cervical plexus neuropathy is not uncommon after ISB using the modified lateral approach and the possibility should be discussed with patients preprocedurally.

在一個鄉村眼科營地深局部和表面結膜下聯合麻醉用於囊外白內障摘除術

Combined Deep Topical and Superior Subconjunctival Anesthesia for Extracapsular Cataract Extraction in a Rural Eye Camp

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Anesth Analg 2009 109: 2025-2027.

背景：眼科營地的白內障手術麻醉要求簡單、 安全、有效。
方法：在泰國的一個鄉村眼科營地作者對 98 名行白內障摘除術的患者進行了研究。白內障摘除術及人工晶狀體植入術 （白內障/人工晶體)患者在深局部聯合結膜下阻滯麻醉。行眼內乳化晶狀體植入術 （超聲乳化/人工晶體) 患者接受表面麻醉。記錄疼痛視覺類比評分、 麻醉手術併發症、 手術時間及其他藥物治療。
結果：白內障/人工晶體組和超聲乳化/人工晶體組患者平均年齡分別為 68.7 和 67.5 歲，手術時間在 16.1 ± 6.7 和 12.0 ± 4.7 min， 疼痛評分在 30.5 mm (12.3 – 54.6 mm) 與 20.0 mm (9.0 – 45.9 mm) 的。超聲乳化/人工晶體組中出現了三例後囊破裂。不需要任何額外的麻醉。無麻醉併發症的發生。
結論：在鄉村眼科營地，深局部麻醉聯合結膜下阻滯麻醉和表面麻醉分別能為白內障/人工晶體植入術和超聲乳化/人工晶體植入提供有效的麻醉。

（唐穎 譯 陳傑 校）

BACKGROUND: Anesthesia for cataract surgery at eye camps needs to be simple, safe, and effective.
METHODS: We prospectively studied 98 patients undergoing cataract extraction in a rural eye camp in Thailand. Patients undergoing extracapsular cataract extraction with intraocular lens implantation (ECCE/IOL) received deep topical anesthesia with subconjunctival anesthesia. Patients undergoing phacoemulsification with intraocular lens implantation (Phaco/IOL) received topical anesthesia. Pain visual analog score, operative and anesthetic complications, operative time, and additional medications were recorded.
RESULTS: A mean age of 68.7 vs 67.5 yr, an operative time of 16.1 ± 6.7 min vs 12.0 ± 4.7 min, and a median (interquartile range) pain score of 30.5 mm (12.3–54.6 mm) vs 20.0 mm (9.0–45.9 mm) were seen in the ECCE/IOL and Phaco/IOL groups, respectively. Three cases of ruptured posterior capsule occurred in the Phaco/IOL group. No additional anesthesia was needed. No anesthetic complications occurred.
CONCLUSION: In a rural eye camp, deep topical anesthesia with subconjunctival anesthesia for ECCE/IOL and topical anesthesia for Phaco/IOL provide effective anesthesia for cataract surgery.

在心肺轉流術期間溫度治療方法和神經保護的核心綜述：是否與複溫速率有關係？

A Core Review of Temperature Regimens and Neuroprotection During Cardiopulmonary Bypass: Does Rewarming Rate Matter?

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Anesth Analg 2009; 109:1741-1751

雖然臨床醫生和基礎科學家進行了半個世紀研究及採取了多種減少風險的方案，但是心臟手術病人仍然繼續遭受著與使用心肺轉流相關的中風和認知功能障礙。減少那些不利影響一個對策是：使用低溫。儘管大量研究報告都討論了這個問題，但是，在心肺轉流期間採用低溫能否減少對中樞神經系統不良影響，這還不得而知。然而，資料清楚表明：圍術期應避免高溫，如果在心肺轉流期間已經使用了低溫，需要謹慎採用複溫策略。選擇體溫監測部位並瞭解體溫監測部位的影響，這對精確評估大腦溫度和避免大腦溫度的意外驟升有重要意義。在本文中，我們對有關在心臟手術期間低溫和複溫速率的影響的文獻進行了綜述。

（王海濤 譯 馬皓琳 李士通 校）

Despite a half century of research and the implementation of various risk-reduction strategies among clinicians and basic scientists, patients continue to experience strokes and cognitive dysfunction related to the use of cardiopulmonary bypass (CPB) for cardiac surgery. One strategy to reduce these detrimental effects has been the use of hypothermia. Although numerous studies have addressed the issue, the question of whether the use of hypothermia during CPB attenuates the impact of central nervous system consequences remains unresolved. However, data clearly demonstrate that hyperthermia is to be avoided in the perioperative period,

necessitating careful rewarming strategies if hypothermia is used during CPB. Selecting and understanding the impact of the temperature-monitoring site is important to accurately estimate cerebral temperature and to avoid inadvertent surges in brain temperature. In this article, we review the literature regarding the impact of hypothermia and rewarming rates during cardiac surgery.

心臟麻醉：30 年後——第二年度 Arthur E. Weyman 演講

Cardiac Anesthesia: Thirty Years Later—The Second Annual Arthur E. Weyman Lecture

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Anesth Analg 2009; 109:1782-1790

心臟麻醉學在過去 30 年有著特殊的發展，從重點關注對心血管疾病患者的麻醉處理的實踐轉變到有助於醫療和手術治療心血管疾病患者的心血管藥物的實踐。第二 Weyman 演講回顧了這一歷史、心血管麻醉師協會在專業發展領域的重要角色、專業持續發展、社會和他們所關心的患者的前景。
（彭中美 譯 馬皓琳 李士通 校）

Cardiac anesthesiology has evolved spectacularly over the past 30 yr, changing from a practice focused on the anesthetic management of patients with cardiovascular diseases to a practice of cardiovascular medicine that contributes to the medical and surgical management of cardiovascular patients. The second Weyman lecture reviews this history, the critical role of the Society of Cardiovascular Anesthesiologists in the evolution of the specialty, and the prospects for continued development for the specialty, the society, and the patients they care for.

全身性用利多卡因可減少門診外科手術後圍術期阿片類止痛劑的需要量但不能縮短出院時間

Systemic Lidocaine Decreased the Perioperative Opioid Analgesic Requirements but Failed to Reduce Discharge Time After Ambulatory Surgery

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Anesth Analg 2009; 109:1805-1808

背景：在本次隨機、盲法、安慰劑對照研究中，我們評估了全身性用利多卡因能否減少門診外科患者的疼痛和出院時間。
方法：67 名患者被分為圍術期注射利多卡因或鹽水。
結果：麻醉後恢復室(PACU)停留時間兩組間沒有差異。在 PACU 和整個研究期間，術中阿片類藥物的使用在利多卡因組明顯減少，但出院後則不是。在

PACU，利多卡因組患者主訴疼痛較輕（直觀類比標度 3.1 ± 2.04 比 4.5 ± 2.9; $P = 0.043$）。術後噁心嘔吐兩組間沒有差異。
結論：圍術期全身性用利多卡因明顯減少日間手術阿片類藥物的需求量且不影響出院時間。
（唐李雋 譯 馬皓琳 李士通 校）

BACKGROUND: In this randomized, blinded, placebo-controlled trial, we evaluated whether systemic lidocaine would reduce pain and time to discharge in ambulatory surgery patients.
METHODS: Sixty-seven patients were enrolled to receive lidocaine or saline infusion perioperatively.
RESULTS: Length of postanesthesia care unit (PACU) stay did not differ between groups. Intraoperative opioid use was significantly less in the lidocaine group, both in the PACU and during the total study period but not after discharge. In the PACU, patients in the lidocaine group reported less pain (visual analog scale score 3.1 ± 2.04 vs 4.5 ± 2.9; $P = 0.043$). There were no differences in postoperative nausea and vomiting.
CONCLUSION: Perioperative systemic lidocaine significantly reduces opioid requirements in the ambulatory setting without affecting time to discharge.

急性等容血液稀釋中每搏量變異

Stroke Volume Variation During Acute Normovolemic Hemodilution

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Anesth Analg 2009; 109:1823-1830

背景：手術病人的血容量應最好控制在避免水中毒和復蘇低下引起的併發症。我們研究術中急性等容血液稀釋的病人中基於由動脈壓測算心輸出量（CO）監測系統(FloTrac/VigileoTM, Edwards Lifesciences, Irvine, CA)的每搏輸出量變異度（SVV）是否能跟蹤血液去除和置換引起的變化。我們進一步評估了 SVV 和 3 維（3D）經食道超聲心動圖（TEE）左心室容量測定值之間的相關性。
方法：選取 25 例計畫在術中進行急性等容血液稀釋的病人。定義 7 個測量時間點：基線、去除估計血容量（EBV）的 5%、10%、15%後、及用等量的 6%羥乙基澱粉置換至估計血容量的–10%、–5%和基線後。在每個時點，從標準監護儀得到心率、收縮壓、舒張壓和動脈平均壓，從 FloTrac/Vigileo 監護儀得到 CO 和 SVV 測定值，並記錄 TEE 圖像用於隨後的離線重建以及左心室收縮末期和舒張末期容量的測定。為了統計，我們使用混合模型方差分析和 Dunnett's 檢驗來分析基線值和後來資料的比較。用 Pearson's 相關性分析檢查 SVV 和左心室容量之間的關係。
結果：方差分析顯示研究過程中心率和平均動脈壓沒有顯著變化。去除 15%的估計血容量後 CO 從 4.9 ± 0.3 L/min 降低至 4.5 ± 0.3 L/min，置換 15%的估計血容量後又最後上升至 5.4 ± 0.3 L/min。去除 15%的估計血容量後 SVV 從 9.2% ± 0.9%上升至 20.3% ± 2.0% ($P < 0.001$)，置換 15%的估計血容量後最後恢復至 7.2% ± 0.9%。去除 15%的估計血容量後左心室舒張末期容量從 42.1 ± 8.3 mL/m2 降低至 36.9 ± 8.3 mL/m2 ($P < 0.001$)，置換 15%的估計血容量後最

後回到 45.9 ± 10.3 mL/m2。SVV 測量值與 3D TEE 測量的左心室容量值呈負相關。
結論：血液稀釋過程中由 FloTrac/Vigileo 系統得到的 SVV 在血液去除和置換時顯著變化。這些變化與 3D TEE 測得的左心室容量值相關。SVV 在指導優化血管內容量的作用還有待進一步研究。
(朱 慧譯 馬皓琳 李士通校)

BACKGROUND: The intravascular volume of surgical patients should be optimized to avoid complications associated with both overhydration and underresuscitation. In patients undergoing intraoperative acute normovolemic hemodilution, we investigated whether stroke volume variation (SVV) derived from an arterial pressure-based cardiac output (CO) monitor system (FloTrac/VigileoTM, Edwards Lifesciences, Irvine, CA) tracked the changes associated with blood removal and replacement. We further evaluated the correlations between SVV and 3-dimensional (3D) transesophageal echocardiographic (TEE) left ventricular (LV) volume measurements.
METHODS: Twenty-five patients had procedures during which acute normovolemic hemodilution was a planned part of the intraoperative management. We defined 7 measurement timepoints: baseline, after the removal of 5%, 10%, and 15% of the estimated blood volume (EBV) and after replacement with an equal volume of 6% hetastarch to –10%, –5%, and baseline EBV. At each timepoint, heart rate and systolic, diastolic, and mean arterial blood pressure were obtained from standard monitors, CO and SVV measurements were obtained from the FloTrac/Vigileo monitor, and TEE images were recorded for subsequent off-line reconstruction and determination of LV end-systolic and end-diastolic volumes. For statistical evaluations, we used a mixed models analysis of variance and Dunnett's test for *post hoc* comparisons with baseline values. Pearson's correlation was used to examine the relationships between SVV and LV volume.
RESULTS: Analysis of variance demonstrated no significant change in heart rate or mean arterial blood pressure over the duration of study. CO decreased from 4.9 ± 0.3 to 4.5 ± 0.3 L/min after removal of 15% of the EBV and then increased to a final value of 5.4 ± 0.3 L/min after replacement of 15% of the EBV. SVV increased from 9.2% ± 0.9% to 20.3% ± 2.0% ($P < 0.001$) after removal of 15% of the EBV and returned to a final value of 7.2% ± 0.9% after replacement of 15% of the EBV. The indexed LV end-diastolic volume decreased from 42.1 ± 8.3 to 36.9.3 ± 8.3 mL/m2 ($P < 0.001$) after removal of 15% of the EBV and then returned to a final volume of 45.9 ± 10.3 mL/m2 after replacement of 15% of the EBV. The measurements of SVV correlated inversely with the 3D TEE LV volume measurements.
CONCLUSIONS: The SVV derived from the FloTrac/Vigileo system changes significantly as blood is removed and replaced during hemodilution. These changes correlate with 3D TEE measurements of LV volume. The utility of SVV in guiding optimization of intravascular volume merits further study.

患者體位元是否影響 BIS 指數監測的讀數？

Does Patient Position Influence the Reading of the Bispectral Index Monitor?

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背景：腦電雙頻指數（BIS）主要用於監測全身麻醉下患者意識水準。已發現一些因素可以影響 BIS 讀數，但不影響麻醉深度。本研究目的是評價改變患者體位元對 BIS 讀數的影響。
方法：40 例行小手術患者，給予全身麻醉。患者保持中性位（平臥位）15min，隨後轉為頭低位（頭低 30°）、中性位元及最後的頭高位（頭高 30°），每個體位持續 15min。記錄體位元時的 BIS、平均動脈壓、心率、呼氣末二氧化碳和呼氣末異氟醚濃度。
結果：頭低位時的 BIS 值較中性位有明顯增加（中位數 47 比 40），而頭高位明顯低於中性位元（39 比 41）（$P < 0.05$）。
結論：患者體位改變明顯影響 BIS 值，這可能影響對麻醉深度的解釋說明。（楊斌 譯 馬皓琳 李士通 校）
BACKGROUND: Bispectral index (BIS) was developed to monitor patients' level of consciousness under general anesthesia. Several factors have been found to alter BIS readings without affecting the depth of anesthesia. We conducted a study to assess the impact of changing patients' position on BIS readings.
METHODS: General anesthesia was administered to 40 patients undergoing minor surgeries. Patients were kept in neutral position (supine) for 15 min and BIS readings, mean arterial blood pressure, heart rate, end-tidal carbon dioxide, and end-tidal isoflurane were recorded. Patients were then shifted to head-down position (30°), neutral position, and lastly head-up position (30°) each of 15-min duration and the data were recorded.
RESULTS: There was a significant increase in BIS values in head-down position (median 47 vs 40) compared with neutral position, whereas head-up position significantly decreased BIS (39 vs 41) compared with neutral position ($P < 0.05$).
CONCLUSION: Changing a patient's position significantly affects the BIS values, which might affect the interpretation of anesthetic depth.

GlideScope®可視喉鏡下經口氣管插管 Flex-ItTM 導芯不如可延展導芯有效

The Flex-ItTM Stylet Is Less Effective than a Malleable Stylet for Orotracheal Intubation Using the GlideScope®

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背景： The GlideScope® 可視喉鏡 (Verathon Medical, Bothell, 華盛頓州)常常可以提供較好的聲門視野，但是在其指導下，通過聲帶行氣管插管卻有一頂難度。這個研究的目的是通過評估氣管插管時間（TTI），比較使用專門的 Flex-ItTM 導芯（FIS, Parker Medical, Highlands Ranch, 科羅拉多）和可伸展導芯。
方法：80 例行擇期手術需要經口插管的病人，被隨機分入 FIS 組和可伸展導芯組（對照組）以便於用可視喉鏡氣管插管。由不知道分組的評估人員記錄 TTI；操作者在喉鏡檢查前不知道分組情況。操作者用 100mm 視覺類比評分

法評估插管的難易程度（0 =容易到 100 = 困難）。記錄嘗試插管的次數、失敗次數、聲門暴露的程度，以及外部喉頭操作。
結果：FIS 組中位氣管插管時間為 41s （四分位距[IQR] 30-51s），對照組為 32s （IQR 28-42s）(*P* = 0.03)。氣管插管難易程度視覺類比評分，FIS 組中位數為 20（IQR11-39），對照組為 15 (IQR 8-28) (*P* = 0.13)。聲門暴露程度 Cormack-Lehane 評級 I 級或 II 級的總發生率為 100%。
結論：由操作熟練的人員使用 GlideScope 可視喉鏡經口氣管插管， Flex-ItTM 導芯（FIS）不如可伸展氣管導管導芯有效。
（張瑩譯 馬皓琳 李士通校）

BACKGROUND: The GlideScope® videolaryngoscope (Verathon Medical, Bothell, WA) usually provides excellent glottic visualization, but directing an endotracheal tube through the vocal cords can be challenging. The goal of the study was to compare the dedicated Flex-ItTM stylet (FIS, Parker Medical, Highlands Ranch, CO) with a malleable stylet, as assessed by time to intubation (TTI).
METHODS: Eighty patients requiring orotracheal intubation for elective surgery were randomly allocated to either the FIS or a malleable stylet (control) to facilitate tracheal intubation using the GlideScope. TTI was recorded by blinded assessors; operators were blinded until after laryngoscopy. The operator assessed the ease of intubation using a 100-mm visual analog scale (0 = easy to 100 = difficult). The number of intubation attempts, number of failures, glottic grades, and use of external laryngeal manipulation were documented.
RESULTS: The median TTI was 41 s (interquartile range [IQR] 30-51) for the Flex-It group compared with 32 s (IQR 28-42) for the control group (*P* = 0.03). The median visual analog scale score for ease of intubation was 20 (IQR 11-39) for the Flex-It group compared with 15 (IQR 8-28) for the control group (*P* = 0.13). The overall incidence of a Cormack-Lehane Grade I or II glottic view was 100%.
CONCLUSIONS: In a group of experienced operators using the GlideScope, the FIS was less effective for orotracheal intubation than a malleable endotracheal tube stylet.

從腦血管壓力傳導中得出的與嚴重頭部損傷重症監護患者意識恢復狀態相關的新指數

A New Index Derived from the Cerebrovascular Pressure Transmission and Correlated with Consciousness Recovery in Severely Head-Injured Intensive Care Patients

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背景：在嚴重頭部損傷的患者中，適度的（20-25mmHg）顱內壓（ICP）均值難以辨別出病情穩定或改善的患者惡化的顱內情況。鑒於這樣的局限性，我們查找了其他與腦血管壓力傳導相關的資訊對顱內壓曲線進行分析。我們試圖在嚴重頭部損傷患者中尋找出從腦血管壓力傳導的光譜分析中得出的且與意識恢復具有相關性生理學意義參數。

方法：2003 年 12 月至 2005 年 12 月期間，在法國 Montpellier 大學醫院的重症監護病房進行了一項前瞻性佇列研究。30 位確診為嚴重頭部損傷的連續患者給予鎮靜劑、機械通氣和腦實質內壓力監測，並且進行 Glasgow 預後評分。從患者發生顱腦損傷今早開始，直至死亡或臨床恢復穩定，由一位元對患者的資料不知情的醫生每隔 15 分鐘同時記錄一次患者顱內壓和動脈血壓同步信號。顱內壓的光譜和動脈壓波形通過傅立葉轉換進行電腦處理。分析心率和呼吸波振幅。心率（呼吸的）增益的定義指顱內壓與動脈血壓信號的的心臟（或呼吸）調波比，分別被標為 Gc 和 Gr。

結果：30 位試驗者中有 20 位恢復了意識（Glasgow 預後評分為 3、4 或 5 分）。在整個記錄期間取平均值的 Gr/Gc（受試者作用特徵[ROC]曲線下面積 0.98，95%可信區間[CI]0.91-1）對意識恢復的辨別程度要好於顱內壓(0.76; 95% CI: 0.54–0.97)、腦灌注壓(0.75; 95% CI: 0.53–0.97)和 Gc(0.77; 95% CI: 0.57–0.99)（每個比較 P 都<0.001）。傷後 30 小時和 162 小時，Gr/Gc≥4 常常意味著意識恢復，其相對危險度為 9（95% CI: 1.42–57.12)。

結論：Gr/Gc 可描述腦血管壓力傳導的特徵，比顱內壓高值和腦灌注壓的低值對嚴重頭部損傷患者病情惡化具有更高的預示能力。Gr/Gc 比下降往往是顱內血流動力學狀態惡化的一個早期預警。

（黃佳佳譯，馬皓琳 李士通校）

BACKGROUND: In patients with serious head trauma, a moderate (20–25 mm Hg) mean level of intracranial pressure (ICP) may fail to distinguish patients with a real deteriorated intracranial status from those who are stable or improving. Because of these limitations, we analyzed the ICP curve in search of other relevant information regarding cerebrovascular pressure transmission. We looked for parameters with physiological meaning extracted from spectral analysis of cerebrovascular pressure transmission and correlated with consciousness recovery in patients with severe head injuries.

METHODS: A prospective cohort study was conducted in an intensive care unit of the University Hospital, Montpellier, France, from December 2003 to December 2005. Thirty consecutive patients admitted for severe head trauma were subjected to sedatives, mechanical ventilation, and intraparenchymatous recording of ICP and were evaluated with Glasgow Outcome Scale score. Simultaneous 60-s recordings of ICP and arterial blood pressure (BP) signals, beginning as soon as possible after head trauma, were repeated until death or clinical stabilization, every 15 min, with physicians blinded to the patients' data. Spectra of ICP and BP waveforms were computed with Fourier transform. Amplitudes of cardiac and respiratory harmonics were analyzed. Cardiac (or respiratory) gain was defined as the ratio of amplitudes of cardiac (or respiratory) harmonic of ICP to BP signals and referred to as Gc and Gr, respectively.

RESULTS: Twenty of the 30 enrolled patients recovered consciousness (Glasgow Outcome Scale score = 3, 4, or 5). Gr/Gc averaged over the whole recording period performed better in discriminating consciousness recovery (area under receiver operating characteristic [ROC] curve: 0.98; 95% confidence interval [CI]: 0.91–1) than ICP (0.76; 95% CI: 0.54–0.97), cerebral perfusion pressure (0.75; 95% CI: 0.53–0.97) and Gc (0.77; 95% CI: 0.57–0.99) ($P < 0.001$ for each comparison). When considering the recording period 30 h posttrauma (hpt), 162 hpt, a value of Gr/Gc ≥4 was always associated with consciousness recovery, and the relative risk was equal to 9 (95% CI: 1.42–57.12).

CONCLUSIONS: Gr/Gc, which characterizes the cerebrovascular transmission, better discriminates bad evolution than high values of ICP or low values of cerebral perfusion pressure in patients with severe head trauma. A reduction in Gr/Gc ratio might be an early alarm signaling worsening intracranial hemodynamic conditions.

重組活化 VII 因數在產科出血中的使用：來自於澳大利亞和新西蘭止血登記處的經驗

Recombinant Activated Factor VII in Obstetric Hemorrhage: Experiences from the Australian and New Zealand Haemostasis Registry

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目的：通過澳大利亞和新西蘭止血登記處，我們報導關於澳大利亞和新西蘭在產科病人中使用重組活化 VII 因數（rFVIIa）的經驗。
方法：rFVIIa 在標籤外適應症包括創傷、心臟手術以及嚴重的產後出血中的作用仍有爭議。由莫納斯（Monash）大學（澳大利亞墨爾本）建立的止血登記處監測 rFVIIa 在澳大利亞和新西蘭的標籤外使用情況。本研究的目的在於匯總參與的醫院在 2002 年 1 月至 2008 年 7 月之間使用 rFVIIa 治療的所有產科出血病人的登記資料。主要的結果指標是出血減少或停止（陽性治療反應）、死亡率以及子宮切除率。
結果：在研究期間，登記處收到 2128 個病例的資料。這包括來自 38 個醫院的 110 例在產科病人中使用 rFVIIa 的病例，占總登記處例數的 5%，其中 105 例因急性出血而接受治療。病人接受 rFVIIa 的個別劑量中位數（四分位間距）為 92 μg/kg (73–100)（中位數總劑量 92 μg/kg [58-108]），78%的病例接受了單次劑量。對 rFVIIa 的陽性反應率為 76%，其中 64%是對首次劑量有反應。28 天時有 91%的患者存活。43 例（41%）在接受 rFVIIa 之前實施了子宮切除術，在剩下的患者中有 13 例（21%）在 rFVIIa 治療後仍需要行子宮切除術。有兩例血栓栓塞事件（1 例肺栓塞，1 例深靜脈血栓形成）和 1 例由嚴重缺氧導致的低氧－缺血性腦病見諸於報導。
結論：報導中 rFVIIa 在許多，但不是全部產科病例中有效。沒有因血栓栓塞併發症導致的死亡。需要有隨機、對照試驗來確認其安全性和有效性，並評估早期使用治療嚴重產後出血，避免需求助於產後子宮切除來控制出血，從而保全生育能力的可能性。
（黃施偉 譯，馬皓琳 李士通 校）

OBJECTIVE: Through the Australian and New Zealand Haemostasis Registry, we report on the Australian and New Zealand experience with recombinant activated factor VII (rFVIIa) in obstetric patients.
METHODS: The role of rFVIIa for off-label indications, including trauma, cardiac surgery, and severe postpartum hemorrhage, remains controversial. The Haemostasis Registry established by Monash University in Melbourne, Australia monitors off-label use of rFVIIa across Australia and New Zealand. The purpose of this study was to summarize Registry data for all obstetric hemorrhage patients treated with rFVIIa at participating hospitals between January 2002 and July 2008. The primary outcome measures were reduction or cessation of bleeding (positive therapeutic response), mortality, and hysterectomy rate.
RESULTS: During the study period, the Registry received data for 2128 patients. This included 110 cases of administration of rFVIIa in obstetric patients from 38 hospitals, comprising 5% of the total Registry population, 105 of whom were treated for acute hemorrhage. Women received median (interquartile range) individual doses of 92 μg/kg (73–100) of rFVIIa (median total dose 92 μg/kg [58–108]), and 78% of patients received a single dose. The positive response rate to rFVIIa was 76% with 64% responding to the first dose. Ninety-one percent of women were alive at 28 days. Forty-three women (41%) underwent hysterectomy before receiving rFVIIa and, of those remaining, 13 (21%) required hysterectomy after rFVIIa therapy. Two thromboembolic events (1 pulmonary embolism and 1 deep venous thrombosis) and 1 case of hypoxic-ischemic encephalopathy resulting from severe anoxia were reported.
CONCLUSIONS: The reported effect of rFVIIa in many, but not all, obstetric cases was positive. There was no mortality as a result of thromboembolic complications. Randomized, controlled trials are required to confirm its safety and efficacy and to assess the possibility that use at an earlier stage in treatment of severe postpartum hemorrhage may avoid the need to resort to postpartum hysterectomy for control of bleeding, thus preserving fertility.

在產科麻醉中全身性的應用瑞芬太尼

Systemic Remifentanil for Labor Analgesia

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目前我們需要一種安全、有效、方便給藥的全身性鎮痛方法從而達到快速起效和終止，配合好子宮收縮的時程，並且不危害胎兒。雖然椎管內阻滯是產科鎮痛的“金標準”，但是全身鎮痛可以應用于那些椎管內鎮痛禁忌、產婦拒絕或僅僅不需要、或操作熟練的麻醉醫生不在場的病例。由於瑞芬太尼獨特的藥理學特性，經過研究且已應用於臨床以提供靜脈內產科鎮痛。在圍繞著這個焦點的綜述中，我們概述了瑞芬太尼作為產科止痛劑的有效性，並回顧了關於其用量、分娩方式、母嬰安全性的最近文獻和將來研究的展望。
（姜旭暉譯，馬皓琳，李士通校）
There is a need for safe, effective, and easy-to-administer systemic analgesia that ideally has rapid onset and offset, matches the time course of uterine contractions, and does not compromise the fetus. Although neuraxial blockade is the "gold

standard" for labor analgesia, systemic analgesia is useful in those cases in which neuraxial analgesia is contraindicated, refused or simply not needed by the parturient, or when skilled anesthesia providers are not available. Because of its unique pharmacologic properties, remifentanil has been investigated, and is used clinically, to provide IV labor analgesia. In this focused review, we summarize the efficacy of remifentanil as a labor analgesic and review the current literature regarding its dose, mode of delivery, safety for the mother and fetus/neonate, as well as the scope for future research.

尼莫地平預防成年小鼠由硝酸甘油引發的低血壓所導致的記憶受損

Nimodipine Prevents Memory Impairment Caused by Nitroglycerin-Induced Hypotension in Adult Mice

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背景：低血壓及其所導致的腦血流下降與認知功能障礙的進展有關。我們驗證了在硝酸甘油(NTG)導致的低血壓起效時使用尼莫地平(NIMO)將有助於保護長期的聯想記憶。
方法：使用被動逃避(PA)模式來評估記憶力。在 PA 訓練，記錄大鼠從懸吊平臺進入裝有自動電擊裝置的樹脂玻璃管內的潛伏期時間（秒）。48 小時後記錄潛伏期時間用於複核子試驗。將 96 只 Swiss-Webster 小鼠(30–35 克, 6–8 周)，隨機分成 6 組：1）生理鹽水（對照組）、2）學習後即刻使用 NTG 組、3）學習後 3 小時使用 NTG 組、4）NTG 及 NIMO 組、5）溶劑組和 6）單獨使用 NIMO 組。研究各組內動物低血壓的程度及腦組織氧合（PbtO2）和腦血流的變化。
結果：各組的訓練潛伏期時間相似(17.0 ± 4.6 s)。與生理鹽水組、NTG + NIMO 組、延遲使用 NTG 組(分別為 580 ± 81 s、557 ± 67 s 及 493 ± 146 s)相比，小鼠在遭受低血壓後表現出潛伏期時間明顯下降(178 ± 156 s)。使用 Kruskal-Wallis 單因素方差分析顯示 4 種處理方法組間有顯著性差異(H = 15.34; P < 0.001)。在沒有進行行為學研究的一個單組小鼠中，相同劑量的 NTG (n = 3) 及 NTG + NIMO (n = 3)使平均動脈壓分別從 85.9 ± 3.8 mm Hg sem 下降至 31.6 ± 0.8 mm Hg sem 及從 86.2 ± 3.7 mm Hg sem 下降至 32.6 ± 0.2 mm Hg sem。單獨使用 NIMO 組小鼠的平均動脈壓從 88.1 ± 3.8 mm Hg 下降至 80.0 ± 2.9 mm Hg。組間差異有統計學意義(P < 0.05)。NTG 組的 PbtO2 從 51.7 ± 4.5 mm Hg sem 下降至 33.8 ± 5.2 mm Hg sem，NTG + NIMO 組的 PbtO2 從 38.6 ± 6.1 mm Hg sem 下降至 25.4 ± 2.0 mm Hg sem，組間無顯著性差異。
結論：在 PA 記憶模式中，小鼠學習後即刻注射 NTG 能使長期聯想記憶明顯受損，而延期注射後導致的低血壓無此作用。NIMO 能減輕由 NTG 引起的長期記憶鞏固的受損，但不能改善無低血壓時的潛伏期時間。因為組間的 PbtO2 指數無差異，所觀察到的 NIMO 的作用可能歸因於低血壓期間鈣穩態的保持。
（裘毅敏譯，馬皓琳、李士通校）

BACKGROUND: Hypotension and a resultant decrease in cerebral blood flow have been implicated in the development of cognitive dysfunction. We tested the hypothesis that nimodipine (NIMO) administered at the onset of nitroglycerin (NTG)-induced hypotension would preserve long-term associative memory.
METHODS: The passive avoidance (PA) paradigm was used to assess memory retention. For PA training, latencies (seconds) were recorded for entry from a suspended platform into a Plexiglas tube where a shock was automatically delivered. Latencies were recorded 48 h later for a testing trial. Ninety-six Swiss-Webster mice (30–35 g, 6–8 wk), were randomized into 6 groups 1) saline (control), 2) NTG immediately after learning, 3) NTG 3 h after learning, 4) NTG and NIMO, 5) vehicle, and 6) NIMO alone. The extent of hypotension and changes in brain tissue oxygenation (PbtO2) and in cerebral blood flow were studied in a separate group of animals.
RESULTS: All groups exhibited similar training latencies (17.0 ± 4.6 s). Mice subjected to hypotensive episodes showed a significant decrease in latency time (178 ± 156 s) compared with those injected with saline, NTG + NIMO, or delayed NTG (580 ± 81 s, 557 ± 67 s, and 493 ± 146 s, respectively). A Kruskal-Wallis 1-way analysis of variance indicated a significant difference among the 4 treatment groups ($H = 15.34$; $P < 0.001$). In a separate group of mice not subjected to behavioral studies, the same dose of NTG ($n = 3$) and NTG + NIMO ($n = 3$) caused mean arterial blood pressure to decrease from 85.9 ± 3.8 mm Hg sem to 31.6 ± 0.8 mm Hg sem and from 86.2 ± 3.7 mm Hg sem to 32.6 ± 0.2 mm Hg sem, respectively. Mean arterial blood pressure in mice treated with NIMO alone decreased from 88.1 ± 3.8 mm Hg to 80.0 ± 2.9 mm Hg. The intergroup difference was statistically significant ($P < 0.05$). PbtO2 decreased from 51.7 ± 4.5 mm Hg sem to 33.8 ± 5.2 mm Hg sem in the NTG group and from 38.6 ± 6.1 mm Hg sem to 25.4 ± 2.0 mm Hg sem in the NTG + NIMO groups, respectively. There were no significant differences among groups.
CONCLUSION: In a PA retention paradigm, the injection of NTG immediately after learning produced a significant impairment of long-term associative memory in mice, whereas delayed induced hypotension had no effect. NIMO attenuated the disruption in consolidation of long-term memory caused by NTG but did not improve latency in the absence of hypotension. The observed effect of NIMO may have been attributable to the preservation of calcium homeostasis during hypotension, because there were no differences in the PbtO2 indices among groups.

單劑量丙泊酚注射對慢性日常頭痛中疼痛和生活品質的影響：一個隨機、雙盲、對照實驗

The Effect of Single-Dose Propofol Injection on Pain and Quality of Life in Chronic Daily Headache: A Randomized, Double-Blind, Controlled Trial

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背景：基於少量個案研究，靜脈注射丙泊酚被提倡用於治療慢性日常頭痛(CDH)。這個治療尚沒有隨機對照試驗。我們進行這個隨機、雙盲、安慰劑

對照實驗的目的是檢測單次靜脈注射丙泊酚 2.4 mg/kg 是否在隨後 30 天導致 CDH 中的殘疾或疼痛在臨床上顯著性減少。
方法：患 CDH 的合適成年人接受積極治療（靜脈輸注丙泊酚）(n = 20)或有藥安慰劑治療（靜脈注射咪達唑侖）（n = 20）。主要的檢測結果包括：(a) 治療後 30 天時的頭痛致殘清單（HDI）、(b)頭痛指數（ 30 天期間頭痛強度的一個總結性值）及(c)使用給藥定量評分版本 III 檢測的鎮痛藥消耗。
結果：丙泊酚注射後 30 天時的 HDI 評分減少了 9.47 分（標準差 14.1）(*P* = 0.009)，但是頭痛有關的殘疾減少的幅度小於 HDI 開發者認為的有臨床意義的減少幅度。對照組 HDI 沒有統計學意義的變化。兩組通過頭痛指數測得的平均疼痛強度和通過給藥定量評分版本 III 測得的藥物使用的減少在組內和組間都沒有統計學意義。
結論：單次靜脈輸注丙泊酚 2.4 mg/kg 後 30 天對 CDH 致殘產生顯著地減少，但沒有臨床意義，且沒有減少疼痛強度和鎮痛劑的使用。這項研究不支持靜脈注射丙泊酚用於臨床處理 CDH 的計畫。
（王宏翻譯，馬皓琳，李士通校正）

BACKGROUND: On the basis of a small number of case studies, IV propofol has been advocated for the treatment of chronic daily headache (CDH). There has been no randomized controlled trial of this therapy. Our objective in this randomized, double-blind, placebo-controlled trial was to determine whether a single IV dose of propofol 2.4 mg/kg results in clinically significant reduction in disability or pain in CDH for the next 30 days.
METHODS: Eligible adults with CDH received either active treatment with IV propofol infusion (*n* = 20) or active placebo of IV midazolam (*n* = 20). The main outcome measures were (a) Headache Disability Inventory (HDI) at 30 days posttreatment, (b) Headache Index, a summary measure of headache intensity over the 30-day period, and (c) analgesic consumption measured as the Medication Quantification Scale version III.
RESULTS: Propofol reduced the HDI by 9.47 points (sd 14.1) at 30 days after injection (*P* = 0.009), but this is a smaller reduction in headache-related disability than that which the developers of the HDI regard as clinically significant. There was no statistically significant change in HDI for the control group. There were no significant within- or between-group reductions in mean pain intensity as measured by the Headache Index or medication use as measured by the Medication Quantification Scale version III in either group.
CONCLUSIONS: A single IV infusion of propofol 2.4 mg/kg produces a statistically significant, but not clinically meaningful, reduction in disability from CDH 30 days after infusion and does not reduce pain intensity or analgesic use. This study does not support this regimen of IV propofol for clinical management of CDH.

酮洛芬產生模式特異性抑制大鼠足底切開後的疼痛行為

Ketoprofen Produces Modality-Specific Inhibition of Pain Behaviors in Rats After Plantar Incision

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背景：儘管用目前的藥物能得到最佳治療，術後疼痛仍然是一個重大的問題。非甾體抗炎藥減輕炎症，並提供鎮痛，但引起不良副作用。
方法：我們測試了大鼠足底切開後用低劑量（0.5-5mg/kg）酮替芬腸外應用以對抗疼痛相關的行為。為了進一步評估酮洛芬在我們的模型中的作用部位，一種新的緩釋微粒的酮洛芬放入傷口部位，並測試其對痛行為的影響。同時對鞘內應用 150μg 酮替芬進行了研究。用血漿樣品測定藥物濃度。
結果：我們發現，腸外應用低劑量酮替芬對疼痛行為產生了模式特異性的影響；切開後的防禦能力下降，而沒有明顯抑制對加熱或機械刺激的過度反應。極低劑量酮替芬（0.5 mg/kg）可產生對防禦的抑制。局部應用緩釋酮替芬洗脫微粒和鞘內注射酮替芬對切皮後的疼痛行為，也產生一種模式特異性的影響，僅僅抑制防禦能力。酮洛芬腸胃外或局部應用後的血漿水準，對術後病人而言，在治療性血藥濃度水準範圍之內。
結論：本研究表明，酮替芬對足底切開後的大鼠是一種不激發防禦的有效鎮痛藥。對機械或熱反應無影響，這突出了多模式測試痛行為對於藥物評價的重要性。我們發現了術後病人中臨床使用的劑量的有效性。
（黃麗娜 譯 馬皓琳 李士通 校）

BACKGROUND: Postoperative pain remains a significant problem despite optimal treatment with current drugs. Nonsteroidal antiinflammatory drugs reduce inflammation and provide analgesia but are associated with adverse side effects.
METHODS: We tested low doses (0.5–5 mg/kg) of parenteral ketoprofen against pain-related behaviors after plantar incision in rats. To further evaluate the potential sites of action of ketoprofen in our model, a novel, sustained-release microparticle formulation of ketoprofen was placed into the wound, and tested for its effects on pain behaviors. Intrathecal ketoprofen (150 μg) was also studied. Plasma samples were assayed for drug concentrations.
RESULTS: We found that low doses of parenterally administered ketoprofen produced a modality-specific effect on pain behaviors; guarding after incision was decreased, whereas no inhibition of exaggerated responses to heat or mechanical stimuli was evident. Very low doses, 0.5 mg/kg, could produce inhibition of guarding. The locally applied sustained-release ketoprofen-eluting microparticles and intrathecally administered ketoprofen also produced a modality-specific effect on pain behaviors after incision, inhibiting only guarding. Plasma levels of ketoprofen after parenteral or local administration were in the range of therapeutic blood levels in postoperative patients.
CONCLUSIONS: This study demonstrates that ketoprofen is an effective analgesic for nonevoked guarding in rats after plantar incision. There was no effect on mechanical or heat responses, which highlights the importance of multiple-modality testing of pain behaviors for drug evaluation. We found efficacy at doses used clinically in postoperative patients.

硬膜外間隙的識別：比較空氣與液體作為阻力消失的介質後併發症的薈萃分析

Epidural Space Identification: A Meta-Analysis of Complications After Air Versus Liquid as the Medium for Loss of Resistance

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背景：鑒定硬膜外間隙來完成椎管內麻醉的最好方法是有爭議的。我們進行這個薈萃分析來證明一個假設，即用液體的阻力消失法能減少硬膜外置管的併發症。
方法：在 MEDLINE、EMBASE 和 Cochrane 資料庫中，檢索在成人硬膜外間隙鑒定中比較空氣和液體作為阻力消失的介質的前瞻性隨機研究。從達到選擇標準的 5 個研究（4 個產科和 1 個非產科）（n＝4422 例患者）中提取資料，並分析以下 6 個結果：置管困難、感覺異常、置管入血管、意外刺破硬膜、硬膜刺破後頭痛和部分阻滯。
結果：在產科人群中併發症的總風險方面，兩種介質之間沒有統計學差異。在用於治療慢性疼痛的硬膜外穿刺過程中用液體時，硬膜刺破後頭痛的風險有一個小的、但有統計學意義的差異。
結論：我們需要更大的研究，可克服跨研究的異質性和併發症發生率相對較低的局限性，來確定硬膜外阻滯中用於阻力消失法的最佳介質。
（唐亮 譯 馬皓琳 李士通 校）
BACKGROUND: The best method for identifying the epidural space for neuraxial blocks is controversial. We conducted this meta-analysis to test the hypothesis that loss of resistance with liquid reduces complications with epidural placement.
METHODS: The MEDLINE, EMBASE, and Cochrane databases were searched for prospective, randomized studies comparing air versus liquid as the medium for loss of resistance during epidural space identification in adults. Data were abstracted from 5 studies (4 obstetric and 1 nonobstetric) (*n* = 4422 patients) that met inclusion criteria and analyzed for the following 6 outcomes: difficult catheter insertion, paresthesia, intravascular catheter insertion, accidental dural puncture, postdural puncture headache, and partial block.
RESULTS: The overall risk differences for adverse outcome between the different mediums were not statistically different for the obstetric population. A small, but statistically significant, risk difference for postdural puncture headache was observed when fluid was used during epidural placement for chronic pain management.
CONCLUSION: Larger studies that overcome limitations of heterogeneity across studies and a relatively infrequent occurrence of complications are required to determine the optimal medium for loss of resistance during epidural block.

體外迴圈手術應首選大劑量的澱粉代血漿平衡液還是以白蛋白為基礎的補液方案

Cardiopulmonary Bypass Priming Using a High Dose of a Balanced Hydroxyethyl Starch Versus an Albumin-Based Priming Strategy

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背景：體外迴圈（CPB）手術應首選哪種補液尚未有定論。在這項研究就中，我們將比較大劑量的澱粉代血漿平衡液（HES）與以白蛋白為基礎的 CPB 補液方案對於凝血功能、炎症反應以及器官功能方面的影響，並做出評估。
方法：50 位擇期行冠狀動脈旁路分流手術的患者將在術中隨機接受以下一種的 CPB 環路補液方案，一個是 1500mL 含 6% HES 130/0.42 的電解質平衡液（鈉 140mmol/L，氯 118mmol/L，鉀 4mmol/L，鈣 2.5mmol/L，鎂 1mmol/L，醋酸鹽 24mmol/L，蘋果酸鹽 5mmol/L）（樣本量=25），一個是 500mL 5%人體白蛋白與 1000mL 0.9%生理鹽水的混合液（樣本量=25）。分別在麻醉誘導後，手術結束即刻，術後 5 小時以及術後第一天和第二天早晨檢測受試者的炎症反應（白介素[IL]-6，-10），內皮細胞損傷（可溶性細胞內黏附分子-1），腎功能（腎特異性蛋白 α-谷胱甘肽-硫-轉移酶，中性粒細胞明膠酶相關脂類），凝血功能（用凝血酶檢測儀檢測[型號 ROTEM（R），Pentapharm，Munich，Germany]）以及血小板功能（用全血集合度計進行檢測[型號 Multiplate(R) analyzer, Dynabyte Medical, Munich, Germany]）。
結果：CPB 術中及術後總的補液量為 3090 +/- 540 mL HES 平衡液和 3110 +/- 450 mL 白蛋白。白蛋白組與 HES 平衡液組相比較少出現術後堿剩餘（-5.9 +/- 1.2 mmol/L vs +0.2 +/- 0.2 mmol/L，P=0.0003）。CPB 後各個檢測時點白蛋白組的血漿 IL-6、IL-10 水準，細胞內黏附分子-1 水平均高於 HES 平衡液組（P=0.0002）。CPB 完成至研究結束的整個過程中，白蛋白組 α-谷胱甘肽-硫-轉移酶和中性粒細胞明膠酶相關脂類的尿液濃度均高於 HES 平衡液組（P=0.00004）。從手術結束到術後第一天所採集的的凝血資料（凝血時間及血凝形成時間）顯示白蛋白組相較於 HES 組凝血功能受損更多（P=0.004）。相較於基線值，大劑量 HES 平衡液組的血小板功能在 CPB 術後即刻和術後 5 小時沒有改變，而白蛋白組的血小板功能卻有明顯下降。
結論：與以白蛋白為基礎的 CPB 補液方案相比，大劑量的 HES 平衡液可以減少炎症反應，減少內皮損傷，對腎小球合成功能的影響較小。同時，大劑量 HES 平衡液在 CPB 術後包括血小板功能在內的凝血功能保護方面也優於以白蛋白為基礎的 CPB 補液方案。
（單嘉琪譯 薛張綱校）

BACKGROUND: The optimal priming solution for cardiopulmonary bypass (CPB) is unclear. In this study, we evaluated the influence of high-volume priming with a modern balanced hydroxyethyl starch (HES) preparation on coagulation, inflammation, and organ function compared with an albumin-based CPB priming regimen.
METHODS: In 50 patients undergoing coronary artery bypass grafting, the CPB circuit was prospectively and randomly primed with either 1500 mL of 6% HES 130/0.42 in a balanced electrolyte solution (Na+ 140 mmol/L, Cl- 118 mmol/L, K+ 4 mmol/L, Ca2+ 2.5 mmol/L, Mg++ 1 mmol/L, acetate- 24 mmol/L, malate- 5 mmol/L) (n = 25) or with 500 mL of 5% human albumin plus 1000 mL 0.9% saline solution (n = 25). Inflammation (interleukins [IL]-6, -10), endothelial damage (soluble

intercellular adhesion molecule-1), kidney function (kidney-specific proteins [alpha]-glutathione S-transferase, neutrophil gelatinase-associated lipocalin), coagulation (measured by thrombelastometry [ROTEM(R), Pentapharm, Munich, Germany]), and platelet function (measured by whole blood aggregometry [Multiplate(R) analyzer, Dynabyte Medical, Munich, Germany]) were assessed after induction of anesthesia, immediately after surgery, 5 h after surgery, and on the morning of first and second postoperative days.
RESULTS: Total volume given during and after CPB was 3090 +/- 540 mL of balanced HES and 3110 +/- 450 mL of albumin. Base excess after surgery was lower in the albumin-based priming group than in the balanced HES priming group (-5.9 +/- 1.2 mmol/L vs +0.2 +/- 0.2 mmol/L, P = 0.0003). Plasma levels of IL-6, IL-10, and intercellular adhesion molecule-1 were higher after CPB in the albumin-based priming group compared with the HES priming group at all time periods (P = 0.0002). Urinary concentrations of [alpha]-glutathione S-transferase and neutrophil gelatinase-associated lipocalin were higher after CPB through the end of the study in the albumin group compared with the balanced HES group (P = 0.00004). After surgery through the first postoperative day, thrombelastometry data (clotting time and clot formation time) revealed more impaired coagulation in the albumin-based priming group compared with the HES priming group (P = 0.004). Compared with baseline, platelet function was unchanged in the high-dose balanced HES priming group after CPB and 5 h after surgery, but it was significantly reduced in the albumin-based priming group.
CONCLUSION: High-volume priming of the CPB circuit with a modern balanced HES solution resulted in reduced inflammation, less endothelial damage, and fewer alterations in renal tubular integrity compared with an albumin-based priming. Coagulation including platelet function was better preserved with high-dose balanced HES CPB priming compared with albumin-based CPB priming.

通過新手行超聲引導下小兒髂腹股溝與髂腹下神經阻滯判定超聲定位的可靠性

Defining the reliability of sonoanatomy identification by novices in ultrasound-guided pediatric ilioinguinal and iliohypogastric nerve blockade.

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背景：髂腹股溝（II）與髂腹下（IH）神經阻滯是一項可靠並廣泛運用的阻滯方式，使用超聲引導可提高其實施的安全性和可靠性。此次研究旨在評估臨床經驗有限的兒科麻醉醫師在行超聲引導區域麻醉時正確識別腹股溝區解剖結構的次數。初期結果為比較腹橫肌（TA）與 II 或 IH 神經正確定位的次數。採用兩種不同類型的超聲設備評估醫療儀器對於成功定位組織結構及定位所需時間的潛在影響。
方法：7 名臨床經驗不足 6 月的兒科麻醉醫師行超聲引導區域麻醉，總共獲得 127 幅麻醉患兒的髂腹股溝區掃描圖像。分別識別並標記肌平面與 II 和 IH 神

經。根據不知情的超聲學專家對超聲影像的評價，判定組織結構定位的準確性及定位所需時間。研究中共需用到兩種類型超聲儀（索諾聲 C180plus 與 Micromaxx，索諾聲公司，波泰爾，華盛頓州）。

結果：正確識別 TA 肌的次數與正確定位 II 或 IH 神經的次數間並無統計學差異（卡方檢驗，TA 與 II，P=0.45；TA 與 IH，P=0.50）。比較兩種類型的超聲儀器後顯示，就提高 II 或 IH 神經定位的準確性而言，其顯著性趨勢並不明顯（II 神經卡方檢驗，P=0.02；IH 神經卡方檢驗，P=0.04；Bonferroni 校正水準 0.17），而在識別肌平面（卡方檢驗，P=0.83）和定位所需時間（單向方差分析法，P=0.07）方面，兩者間無統計學差異。根據結構定位的準確性及掃描圖像的數量繪製座標曲線，發現在完成 14-15 次超聲掃描後可成功識別 TA，而正確定位 II 或 IH 則需完成 18 次掃描。

結論：研究證實，雖然識別肌平面的準確度與識別 II 或 IH 神經的總體準確度間無顯著性差異，但肌平面只需在較少實施腹股溝區超聲掃描後便可可靠定位。建議缺乏臨床經驗的執業醫師在行超聲引導 II 或 IH 神經阻滯時，可將腹橫肌或腹內斜肌的肌平面作為掃描的可靠終點，據報導 100%的病例均可在此發現 II 和 IH 神經。

（范羽譯 薛張綱校）

BACKGROUND: The ilioinguinal (II)/iliohypogastric (IH) nerve block is a safe, frequently used block that has been improved in efficacy and safety by the use of ultrasound guidance. We assessed the frequency with which pediatric anesthesiologists with limited experience with ultrasound-guided regional anesthesia could correctly identify anatomical structures within the inguinal region. Our primary outcome was to compare the frequency of correct identification of the transversus abdominis (TA) muscle with the frequency of correct identification of the II/IH nerves. We used 2 ultrasound machines with different capabilities to assess a potential equipment effect on success of structure identification and time taken for structure identification.

METHODS: Seven pediatric anesthesiologists with <6 mo experience with ultrasound-guided regional anesthesia performed a total of 127 scans of the II region in anesthetized children. The muscle planes and the II and IH nerves were identified and labeled. The ultrasound images were reviewed by a blinded expert to mark accuracy of structure identification and time taken for identification. Two ultrasound machines (Sonosite C180plus and Micromaxx, both from Sonosite, Bothell, WA) were used.

RESULTS: There was no difference in the frequency of correct identification of the TA muscle compared with the II/IH nerves (chi(2) test, TA versus II, P = 0.45; TA versus IH, P = 0.50). Ultrasound machine selection did show a nonsignificant trend in improving correct II/IH nerve identification (II nerve chi(2) test, P = 0.02; IH nerve chi(2) test, P = 0.04; Bonferroni corrected significance 0.17) but not for the muscle planes (chi(2) test, P = 0.83) or time taken (1-way analysis of variance, P = 0.07). A curve of improving accuracy with number of scans was plotted, with reliability of TA recognition occurring after 14-15 scans and II/IH identification after 18 scans.

CONCLUSIONS: We have demonstrated that although there is no difference in the overall accuracy of muscle plane versus II/IH nerve identification, the muscle planes are reliably identified after fewer scans of the inguinal region. We suggest that a reliable end point for the inexperienced practitioner of ultrasound-guided II/IH nerve block may be the TA/internal oblique plane where the nerves are reported to be found in 100% of cases.

右美托咪定與異丙酚鎮靜下腦電雙頻指數與表觀鎮靜程度之間的關係

The correlation between bispectral index and observational sedation scale in volunteers sedated with dexmedetomidine and propofol.

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背景：腦電雙頻指數(BIS)是廣泛應用的評價麻醉鎮靜深度的指標。右美托咪定是一種新的鎮靜藥物，它在鎮靜的同時還可以保持一定的合作性並且可以很容易喚醒。BIS用於評價右美托咪定的鎮靜深度作用並不理想。因此，我們試圖驗證在警覺性與鎮靜深度的觀察者評分(OAA/S)具有可比性的條件下右美托咪定鎮靜時的BIS值低於異丙酚的BIS值。

方法：本次研究為期2天，隨機，採用自身配對的研究方法。第一天，健康志願者們隨機分為進入異丙酚與右美托咪定組。分別通過電腦自動控制靶控輸注維持異丙酚效應室濃度在1,2和4ug/ml;右美托咪定的血漿濃度在0.6,1.2和2.4ng/ml。在達到目標濃度的20分鐘和40分鐘，記錄BIS值和OAA/S評分。分別比較兩組在各個OAA/S評分下的BIS值。通過分析受試者特徵曲線得到對於BIS值OAA/S評分的截斷值為小於等於2。

結果：總計9名志願者。右美托咪定鎮靜下心率明顯下降。呼末二氧化碳隨異丙酚劑量增加而下降，右美托咪定無此作用。異丙酚鎮靜下在OAA/S為1,2,3,4和5分時BIS值分別為95.5 (90-97), 78 (71-84.5), 67 (64-70), 57 (51.5-60), 和34 (30-37)。右美托咪定鎮靜下在OAA/S為1,2,3,4和5分時BIS值分別為95 (79-98), 62 (53.5-68.5), 45.5 (45.3-52), 39.5 (34.3-41.8), 和24.5 (22.5-30.5)。在OAA/S為2,3和4分時，右美托咪定組的BIS值均顯著低於異丙酚組。在OAA/S評分小於等於2時異丙酚組的BIS截斷值為67(敏感性86%,特異性97%,曲線下面積0.98)，而右美托咪定組的BIS截斷值為46(敏感性84%,特異性91%,曲線下面積0.96)。

結論：臨床工作中評價鎮靜深度時，同時使用BIS值和鎮靜深度評分會得到不同且互補的結果。尤其是當應用右美托咪定時，更顯出相對于單一方法的優越性。

（黃劍譯 薛張綱校）

BACKGROUND: Bispectral index (BIS) is a widely used quantitative parameter for evaluating anesthesia and sedation levels. Dexmedetomidine is a novel sedative, providing sedation while patients remain cooperative and can be easily aroused; as a consequence, BIS used with dexmedetomidine may poorly characterize sedation. Thus, we tested the hypothesis that BIS values are lower with dexmedetomidine than with propofol at comparable Observer's Assessment of Alertness and Sedation (OAA/S) scores.

METHODS: This was a randomized, 2-day, crossover study. On the first study day, healthy volunteers were randomly allocated to either propofol or dexmedetomidine sedation. Drugs were administered using computer-controlled infusions targeting an

effect-site concentration of 1, 2, and 4 microg/mL for propofol or a plasma concentration of 0.6, 1.2, and 2.4 ng/mL for dexmedetomidine. The relationship between BIS and OAA/S score was obtained 20 and 40 min after changing each drug concentration. BIS values at each OAA/S score were compared between drugs. The cutoff values of BIS for OAA/S score of < or =2 were obtained by analysis of receiver operating characteristic curves.
RESULTS: Nine volunteers were included in our analysis. Heart rates decreased significantly with dexmedetomidine sedation. ETco(2) was significantly increased with high doses of propofol but did not increase with high doses of dexmedetomidine. BIS values at OAA/S scores of 1, 2, 3, 4, and 5 during propofol sedation were 95.5 (90-97), 78 (71-84.5), 67 (64-70), 57 (51.5-60), and 34 (30-37), respectively. BIS values at OAA/S scores of 1, 2, 3, 4, and 5 during dexmedetomidine sedation were 95 (79-98), 62 (53.5-68.5), 45.5 (45.3-52), 39.5 (34.3-41.8), and 24.5 (22.5-30.5), respectively. BIS values were significantly less with dexmedetomidine than propofol at OAA/S responsiveness scores of 2, 3, and 4. The calculated cutoff BIS values for OAA/S scores of < or =2 were 67 (sensitivity of 86%, specificity of 97%, and area under the curve of 0.98) for propofol and 46 (sensitivity of 84%, specificity of 91%, and area under the curve of 0.96) for dexmedetomidine.
CONCLUSION: The combination of both BIS and sedative scales could provide different and complementary data to the clinician evaluating the patient's response to sedation than would either tool alone, especially when dexmedetomidine is used.

豬模型中應用微孔膜進質譜分析肺分流量與賴利分流的比較

A Comparison of Micropore Membrane Inlet Mass Spectrometry–Derived Pulmonary Shunt Measurement with Riley Shunt in a Porcine Model

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背景： 多個惰性氣體排除技術被開發用於測量肺內各部分的通氣血流比(V(A)'/Q')。在兔子肺模型中，應用微孔膜進質譜(MMIMS)取代了氣相色譜用於惰性氣體的測量。然而，對動脈氧量的測定還沒有一種被公認的並可常用的方法。我們用豬肺損傷模型將 MMIMS 分流作為心總輸出量（CO）的一小部分與根據賴利分流規則得到的萊利分流進行比較。
方法：要允許廣泛的肺不張並有分流的變異，對 8 個對照動物不進行肺灌洗，而另 8 個動物以 30 mL/kg 溫的乳酸林格液按以下方法進行肺灌洗：2 個動物肺灌洗 1 次，5 個動物灌洗 2 次，1 個動物灌洗 3 次。在基礎線和兩次肺損害以後紀錄變數(T1 和 T2)。用 MMIMS 分析磺化六氟化合物、氪、地氟醚、安氟醚、

二乙醚和丙酮的資料，並且應用已知的多個惰性氣體分析技術得到了 MMIMS 分流資料。應用標準公式演算得到 R-S。
結果：記錄了 44 對 M-S 和 R-S。 M-S 變化範圍從 0.1%到 35.4%，R-S 的變化範圍從 3.7%到 62.1%。M-S 顯示出與 R-S 呈線性相關： M-S = -4.26 + 0.59 x R-S (r (2) = 0.83)。M-S 平均低於 R-S (平均數= -15.0% CO、sd = 6.5% CO 和中位數= -15.1)，上下限分別為-2.0%和-28.0%。95%可信區間的下限和上限是-17.0 和-13.1 (P < 0.001，t 檢驗)。
結論：在呼吸過程中惰性氣體微孔膜進質譜獲得的分流資料與 R-S 良好相關。MMIMS 分流通常比 R-S 少。
（李瑩譯 薛張綱校）

BACKGROUND: The multiple inert gas elimination technique was developed to measure shunt and the ratio of alveolar ventilation to simultaneous alveolar capillary blood flow in any part of the lung (V(A)'/Q') distributions. Micropore membrane inlet mass spectrometry (MMIMS), instead of gas chromatography, has been introduced for inert gas measurement and shunt determination in a rabbit lung model. However, agreement with a frequently used and accepted method for quantifying deficits in arterial oxygenation has not been established. We compared MMIMS-derived shunt (M-S) as a fraction of total cardiac output (CO) with Riley shunt (R-S) derived from the R-S formula in a porcine lung injury model.
METHODS: To allow a broad variance of atelectasis and therefore shunt fraction, 8 sham animals did not receive lavage, and 8 animals were treated by lung lavages with 30 mL/kg warmed lactated Ringer's solution as follows: 2 animals were lavaged once, 5 animals twice, and 1 animal 3 times. Variables were recorded at baseline and twice after induction of lung injury (T1 and T2). Retention data of sulfur hexafluoride, krypton, desflurane, enflurane, diethyl ether, and acetone were analyzed by MMIMS, and M-S was derived using a known algorithm for the multiple inert gas elimination technique. Standard formulas were used for the calculation of R-S.
RESULTS: Forty-four pairs of M-S and R-S were recorded. M-S ranged from 0.1% to 35.4% and R-S from 3.7% to 62.1%. M-S showed a correlation with R-S described by linear regression: M-S = -4.26 + 0.59 x R-S (r(2) = 0.83). M-S was on average lower than R-S (mean = -15.0% CO, sd = 6.5% CO, and median = -15.1), with lower and upper limits of agreement of -28.0% and -2.0%, respectively. The lower and upper limits of the 95% confidence intervals were -17.0 and -13.1 (P < 0.001, Student's t-test).
CONCLUSIONS: Shunt derived from MMIMS inert gas retention data correlated well with R-S during breathing of oxygen. Shunt as derived by MMIMS was generally less than R-S.

比較通過透射率和反射測定脈搏氧飽和度的儀器應用於血管外科手術

A Comparison of Transmittance and Reflectance Pulse Oximetry During Vascular Surgery

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背景：相比于傳統放置在指尖、蹠、耳垂的通過透射率測定氧飽和度儀器在末梢低灌注患者的使用限制，新型的將探針放置在前額通過反射測定氧飽和度的儀器有一定改進。我們比較了血管手術使用這兩種儀器的可靠性和準確性。
方法：患有外周血管疾病的患者行血管手術進行全麻，分別使用放置在耳垂通過透射率測定及放置在前額通過反射測定氧飽和度的儀器監測。使用兩種儀器連續測定 Spo_2，同時抽取動脈血測定血氣。我們記錄了兩種儀器每分鐘的平均值，並通過 Bland-Altman 統計分析。
結果：20 名患者每分鐘測定一次氧飽和度總共收集了 3993 對資料。兩種儀器都沒有測量失敗超過 1 分鐘。Bland-Altman 曲線顯示了兩種儀器的可信範圍為－4.0%到 2.6%。分析了 14 名患者的 28 個動脈樣本，Sao_2 均與兩種儀器測定的 Spo_2 相接近。與 Sao_2 相比較，探針放在耳垂的可信範圍為－4.7%到 6.1%，探針放在前額的可信範圍為－3.3%到 3.4%。
結論：新的放在前額的通過反射進行測定 Spo_2 的儀器，相比于傳統放在耳垂的儀器，應用於行血管外科手術的患者其準確性是可以接受的。
（陳珺珺譯 薛張綱校）

BACKGROUND: New reflectance pulse oximetry probes placed on the forehead may be an improvement over transmittance probes placed on a finger, toe, or earlobe in patients with compromised perfusion. We compared the reliability and accuracy of the 2 types of probes in patients undergoing vascular surgery.
METHODS: Patients with peripheral vascular disease undergoing vascular surgery under general anesthesia were monitored with both a transmittance earlobe probe and a reflectance forehead probe. Spo_2 was recorded continuously from both probes, and arterial blood gas samples wereanalyzed when clinically indicated. The average values from both probes over each minute were compared using Bland-Altman analysis.
RESULTS: Twenty patients were included yielding a total of 3993 1-min averaged data pairs. Neither probe failed to report a value for more than 1 min. A Bland-Altman plot showed the limits of agreement between the probes of –4.0% to +2.6%. Twenty-eight arterial blood samples were analyzed for 14 patients and Sao_2 closely matched both Spo_2 probe values at the time of sampling. Compared with Sao_2, analysis demonstrated limits of agreement of –4.7% to 6.1% for ear and –3.3% to 3.4% for forehead sites.
CONCLUSIONS: The new reflectance forehead Spo_2 probe tested has acceptable agreement with the older transmittance probe placed on the earlobe for pulse oximetry within typical ranges of Spo_2 in patients undergoing vascular surgery.

綜合困難氣道處理方案使建立急性外科氣道的需要減少

Need for Emergency Surgical Airway Reduced by a Comprehensive Difficult Airway Program

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背景：不能為呼吸衰竭的病人進行氣管插管和通氣與併發症和死亡率顯著相關。如果在氣道管理方面有經驗的麻醉醫生或其他醫療保健提供者不能通過面罩為病人通氣和/或通過直接喉鏡氣管插管，則認為該例為困難氣道病人。
方法：我們對一個部門的資料進行了回顧性分析來分析綜合困難氣道處理方案是否使通過環甲膜穿刺或氣管切開的外科處理來保證氣道的需要減少。我們將綜合困難氣道處理方案開始前四年間（1992 年 1 月至 1995 年 12 月）報導的每年由於插管和通氣失敗而建立非計畫的急性外科氣道例數與該方案開始後 11 年（1996 年 1 月至 2006 年 12 月）的年例數進行比較。
結果：急性外科氣道的例數從方案開始前 4 年間的 6.5 ± 0.5 例/年下降至方案開始之後 11 年間的 2.2 ± 0.89/年($P < 0.0001$)。1992 年 1 月至 1995 年 12 月的四年間，報導了 26 例急性外科氣道，而之後 11 年（1996 年 1 月至 2006 年 12 月）卻總共報導了 24 例外科氣道。
結論：綜合困難氣道處理方案與 11 年間由於麻醉醫生插管和通氣失敗而建立外科氣道的病例數持續下降有關，雖然報導的困難氣道例數在增加，每年接受麻醉的病人總數也在增加。
（姚敏敏譯 薛張綱校）

BACKGROUND: Inability to intubate and ventilate patients with respiratory failure is associated with significant morbidity and mortality. A patient is considered to have a difficult airway if an anesthesiologist or other health care provider experienced in airway management is unable to ventilate the patient's lungs using bag-mask ventilation and/or is unable to intubate the trachea using direct laryngoscopy.
METHODS: We performed a retrospective review of a departmental database to determine whether a comprehensive program to manage difficult airways was associated with a reduced need to secure the airway surgically via cricothyrotomy or tracheostomy. The annual number of unplanned, emergency surgical airway procedures for inability to intubate and ventilate reported for the 4 yr before the program (January 1992 through December 1995) was compared with the annual number reported for the 11 yr after the program was initiated (January 1996 through December 2006).
RESULTS: The number of emergency surgical airways decreased from 6.5 ± 0.5 per year for 4 yr before program initiation to 2.2 ± 0.89 per year for the 11-yr period after program initiation ($P < 0.0001$). During the 4-yr period from January 1992 through December 1995, 26 surgical airways were reported, whereas only 24 surgical airways were performed in the subsequent 11-yr period (January 1996 through December 2006).
CONCLUSIONS: A comprehensive difficult airway program was associated with a reduction in the number of emergency surgical airway procedures performed for the inability of an anesthesiologist to intubate and ventilate, a reduction that was sustained over an 11-yr period. This decrease occurred despite an increase in the number of patients reported to have a difficult airway and an overall increase in the total number of patients receiving anesthesia per year.

自主通氣對急性呼吸窘迫綜合症患者肺換氣分佈的影響：氣道壓力釋放通氣與壓力支持通氣的比較

The Impact of Spontaneous Ventilation on Distribution of Lung Aeration in Patients with Acute Respiratory Distress Syndrome: Airway Pressure Release Ventilation Versus Pressure Support Ventilation

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背景：在這項研究中，我們嘗試來決定氣道壓力釋放通氣（APRV）或者壓力支援通氣（PSV）兩者中哪種模式更能減少急性肺損傷或急性呼吸窘迫綜合症患者的肺不張。
方法：這是一項在重症監護室中所做的回顧性研究。在 2006 到 2007 年間，18 名急性肺損傷或急性呼吸窘迫綜合症患者接受了 APRV 或 PSV，同時在 3 天內進行了 2 次螺旋 CT 掃描。
結果：APRV 組和 PSV 組（每組各含 9 名患者）的 CT 掃描資料經過三維重建和容量分析。肺充氣區域（正常充氣，充氣不足，未充氣和過度充氣）由亨斯費爾德團隊通過其密度來確定。在通氣後，動脈血分壓/吸入氧濃度比值和肺泡-毛細血管氧梯度在兩組中都有所改善（P=0.008）；然而，在相同的氣道壓力下，APRV 組的改善大於 PSV 組。在 APRV 組中，肺不張顯著減少，由 41% (範圍, 17%–68%) 降至 19% (範圍, 6%–40%)(P = 0.008)，肺正常充氣區域體積顯著上升，由 29% (範圍, 13%–41%) 到 43% (範圍, 25%–56%) (P = 0.008)。在 PSV 組中，肺容量沒有改變。
結論：APRV 期間自主通氣能通過減少肺不張來改善肺通氣。PSV 能有效改善氣體交換，但不能充分促進肺充氣。這些結果表明了 APRV 在 ARDS 患者中作為主要的輔助通氣模式，在減少肺不張方面比 PSV 更有效。
（俞佳譯 薛張綱校）

BACKGROUND: In this study, we sought to determine which mode, airway pressure release ventilation (APRV) or pressure support ventilation (PSV), decreases atelectasis more in patients with acute lung injury/acute respiratory distress syndrome (ARDS).
METHODS: This was a retrospective study in the intensive care unit. Between 2006 and 2007, we identified 18 patients with acute lung injury/ARDS who received either APRV or PSV and had a helical computed tomography scan twice in 3 days.
RESULTS: Computed tomography data from the APRV and PSV groups (n = 9 each) were analyzed for 3-dimensional reconstruction and volumetry. Aerated lung regions (normally aerated, poorly aerated, nonaerated, and hyperinflated) were identified by their densities in Hounsfield units. The Pao2/Fio2 ratio and alveolar-arteriolar oxygen gradient after ventilation were improved in both groups (P = 0.008); however, the improvements in the APRV group exceeded those in the PSV group when delivered with equal mean airway pressure (P = 0.018 and 0.015, respectively). Atelectasis decreased significantly from 41% (range, 17%–68%) to 19% (range, 6%–40%) (P = 0.008) and normally aerated volume increased significantly from 29% (range, 13%–41%) to 43% (range, 25%–56%) (P = 0.008) in the APRV group, whereas lung volume did not change in the PSV group.
CONCLUSIONS: Spontaneous ventilation during APRV improves lung aeration by decreasing atelectasis. PSV for gas exchange is effective but not sufficient to improve lung aeration. These results indicate that APRV is more efficient than PSV as a mode of primary ventilatory support to decrease atelectasis in patients with ARDS.

晶體和膠體溶液對脊髓麻醉的剖宮產病人術中心輸出量的影響

The Effects of Crystalloid and Colloid Preload on Cardiac Output in the Parturient Undergoing Planned Cesarean Delivery Under Spinal Anesthesia: A Randomized Tria

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Anesth Analg 2009 109: 1892-1900

背景：剖宮產病人在脊髓麻醉後低血壓仍然是一個主要的臨床問題。擴容與升壓藥一起被用於減少其發生率。以前的研究用無創血壓測量和升壓藥的需求來評價擴容效果。我們分別在脊髓麻醉前後使用了多普勒血流測量技術來衡量已接受 3 份液體擴容的產婦心輸出量（CO）和糾正時間（FTc，一種血容量測量方法）。我們認為膠體比晶體產生對心輸出量增加更有效，低血壓的發生率更低。

方法：60 位健康的計畫腰麻下剖宮產的婦女被招募將於本隨機，雙盲研究。基線心率，收縮壓（收縮壓），二氧化碳，和 FTc 在左外側傾斜的位置記錄。病人隨機在超過 15 分鐘的時間裡接受 3 份液體擴容：1.5 升晶體（哈特曼的解決方案），0.5 升 6%羥乙基澱粉（HES）溶液（HES0.5），或 1 升 6%6%羥乙基澱粉（HES）溶液（HES0.5）。擴容後每 30 分鐘 5 分鐘進一步的測量。 30 分鐘後，椎管內給予 12.5 重比重布比卡因與芬太尼 15 微克，每 5 分鐘或 20 分鐘記錄一次直到手術開始。主要結果，比較各組心輸出量。低血壓的發生率（定義為收縮壓減少基礎血壓的 20%），麻黃堿使用和臍帶血液氣體也進行了比較。

結果：病人的特質，心率，血壓各組相似。雖然各組擴容後心輸出量和 FCt 均增加（P<0.005），但只有 HES1.0 組可保持至脊髓麻醉後（P<0.005）。其中有低血壓的發生率（70%:35%: 65%分別對應哈特曼的解決方案，HES0.5，HES1.0，P 值= 0.069）和麻黃堿平均用量（10.4：5.7：9.7 毫克; P = 0.26）各組無差異。

結論：儘管 CO 和 FTc 擴容後增加，特別是使用 HES1.0 升，但仍然無法避免低血壓的發生。資料表明，脊椎麻醉後心輸出量的增加不足以彌補動脈壓的下降。

（張玥琪譯，薛張綱校）

BACKGROUND: Hypotension after spinal anesthesia for cesarean delivery remains a major clinical problem. Fluid preloading regimens together with vasopressors have been used to reduce its incidence. Previous studies have used noninvasive arterial blood pressure measurement and vasopressor requirements to evaluate the effect of preload. We used a suprasternal Doppler flow technique to measure maternal cardiac output (CO) and corrected flow time (FTc, a measure of intravascular volume) before and after spinal anesthesia after 3 fluid preload regimens. We hypothesized that colloid solutions, compared with crystalloid, would produce the largest increase in CO and have the lowest incidence of hypotension.

METHODS: Sixty healthy term women scheduled for planned cesarean delivery under spinal anesthesia were recruited for this randomized, double-blind study. Baseline heart rate, systolic blood pressure (SBP), CO, and FTc were recorded in the left lateral tilt position. Patients were randomized to receive 1 of 3 fluid preload regimens given over 15 min: 1.5 L crystalloid (Hartman's solution), 0.5 L of 6% w/v hydroxyethyl starch (HES) solution (HES 0.5), or 1 L of 6% w/v HES solution (HES 1.0). Further measurements were made after fluid loading every 5 min for 30 min. After 30 min, spinal anesthesia was induced with hyperbaric bupivacaine 12.5 mg with fentanyl 15 μg and recordings were continued every 5 min for 20 min or until surgery started. The primary outcome, CO, was compared among groups. The incidence of hypotension (defined as a 20% reduction in SBP from the baseline), ephedrine use, and umbilical cord blood gases were also compared.
RESULTS: Patient characteristics, heart rate, SBP, and cord gases were similar among groups. Although CO and FTc increased after preload in all groups ($P < 0.005$), this was only maintained with HES 1.0 after spinal anesthesia ($P < 0.005$). There were no differences among groups in the incidence of hypotension (70% vs 35% vs 65% for Hartman's solution, HES 0.5, and HES 1.0, respectively; $P = 0.069$) or mean ephedrine dose (10.4 vs 5.7 vs 9.7 mg; $P = 0.26$).
CONCLUSION: Despite CO and FTc increases after fluid preload, particularly with HES 1.0 L, hypotension still occurred. The data suggest that CO increases after these preload regimens cannot compensate for reductions in arterial blood pressure after spinal anesthesia.

產婦合併脊柱側凸軸索麻醉的臨床適應證

Clinical implications of neuraxial anesthesia in the parturient with scoliosis

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脊柱側凸向軸索麻醉的實施和效果提出挑戰。我們回顧了在合併未矯形或已經矯形（即，外科途徑）的脊柱側凸產婦應用軸索技術的所有文獻。有 22 篇文獻報導了共 117 例患者（未矯形 n=24, 已矯形 n=93）。其中，79%的未矯形患者和 69%的已矯形患者的軸索麻醉很成功。軸索麻醉在已經矯形的患者更具挑戰，此組患者中實施困難的 90%為硬膜外麻醉。據報導， 103 例患者中有 3 位會出現合併症。我們為優化此類患者應用軸索麻醉技術的效果提供建議。
（張釗譯 薛張綱校）

Scoliosis can pose challenges to the initiation and function of neuraxial anesthetics. We reviewed the available literature exploring neuraxial techniques in parturients with uncorrected or corrected (i.e., surgically instrumented) scoliosis. The 22 articles reported 117 attempted neuraxial procedures (uncorrected n = 24 and corrected n = 93). Of these procedures, 79% of uncorrected patients and 69% of corrected patients were successfully managed with neuraxial anesthesia. Procedures were typically more challenging in corrected patients; 90% of all reported difficulties in this subgroup involved epidural anesthetics. Complications were reported in 3 of 103 patients. We provide suggestions for optimizing efficacy of neuraxial techniques in these patients.

成人囊性纖維化患者的圍手術期管理

Perioperative Management of the Adult with Cystic Fibrosis

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Anesth Analg 2009 109: 1949-1961

自 1938 年囊性纖維化(CF)首次在腹部疾病中被發現，對這類病人的治療有了很大的改進。這些進步導致了該病患者的生存率及生活品質的顯著提高。由於上述原因，現在大多數 CF 患者是成年人，而不是兒童。1989 年首先通過定位克隆發現了與 CF 相關的基因。儘管大家相信基因治療的前景不錯，但是目前基因治療用於 CF 並不成功。儘管 CF 患者中 90%的病人死于肺部疾病，他們同時可以患有包括糖尿病在內的胰腺疾病，骨科疾病，肝臟疾病及泌尿生殖系統疾病。CF 患者圍手術期管理要求很好地瞭解該疾病的病理生理變化。我們複習了該種疾病相關的概念，包括了肝移植、肺移植及懷孕等特殊問題的考慮。
（陳珺珺譯 薛張綱校）

Since cystic fibrosis (CF) was first differentiated from celiac disease in 1938, the medical care of patients with CF has substantially improved. These improvements have resulted in a significant increase in median survival and the quality of life experienced by patients. The resultant increase in survival has caused the "average" CF patient to be a young adult and not a child. The gene that causes CF was first identified in 1989 and is the first gene discovered by positional cloning. Unfortunately, gene therapy for CF has not been successful, although it continues to hold great promise for future patient care. Although pulmonary disease is responsible for more than 90% of the morbidity and mortality in patients with CF, they also experience pancreatic disease, including diabetes mellitus, bone disease, hepatobiliary disease, and genitourinary disease. The optimal perioperative management of patients with CF requires an understanding of the relevant pathophysiology and the unique challenges presented by these patients. We reviewed these concepts, including special considerations such as liver and lung transplantation and pregnancy.

慢性疼痛患者鞘內注射嗎啡對社會心理學方面的改善

Improvement in Psychosocial Outcomes in Chronic Pain Patients Receiving Intrathecal Morphine Infusions

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Anesth Analg 2009 109: 1981-1986

背景:對於慢性疼痛的患者，傳統的多模式鎮痛的效果是不理想的。儘管目前已使用植入式嗎啡泵，但是這種有創的鎮痛治療對於患者社會心理學方面的影響尚存在爭議。在這項回顧性研究中，我們評估了鞘內注射嗎啡對於疼痛感覺及

社會心理學功能方面的影響。這項研究的另一個目的是評估鞘內注射嗎啡後對患者機能活動的影響。

方法：30 名使用多模式鎮痛無效的非惡性腫瘤的疼痛患者參與了這項研究，在使用鞘內嗎啡輸注泵前、輸注後 3、12、24 個月後，分別給予 McGil 疼痛問卷調查表。在每次隨訪時，患者的疼痛程度使用 11 分制的疼痛評分表，即 0 分代表沒有疼痛，10 分代表最痛。開始嗎啡的用量為 0.23± 0.14 mg/天（範圍從 0.09 至 0.75 mg/天），並且調整嗎啡劑量使疼痛評分<50%初始值。同時在每次隨訪時調查不良反應、併發症及機能活動。

結果：在隨訪的 24 個月中，患者疼痛的程度明顯緩解。McGill 疼痛問卷表改善了 66%，有效性改善了 59%，感覺成分改善了 32%。嗎啡的平均用量在 3、12、24 個月時分別增加為 0.44 ± 0.29, 0.66 ± 0.39 和 0.80 ± 0.45 mg/天($P <$ 0.05)。慢性疼痛緩解後提高了社會、工作、家庭關係和生活品質。13 名尚在職年齡的患者中，12 名重新恢復了全日制工作；17 名退休患者中，14 名減少了幫助的要求。

結論：對於已使用多模式鎮痛但效果不佳的慢性疼痛患者，鞘內使用植入式嗎啡輸注泵可以改善患者社會心理功能。

（陳珺珺譯 薛張綱校）

BACKGROUND: When conventional multimodal analgesic therapy is unsuccessful, more aggressive analgesic treatments are required for patients with intractable chronic pain. Despite extensive clinical experience with implanted morphine pumps, there is still controversy regarding the psychosocial effects of this invasive analgesic therapy. In this prospective study, we evaluated the impact of intrathecal (IT) morphine infusions on pain perception and psychosocial functionality. A secondary objective of this pilot study was to assess the effect of IT morphine infusion on the patient's level of functional activity.

METHODS: Thirty patients with chronic nonmalignant pain that failed to respond to multimodal analgesic regimens were evaluated using the McGill Pain Questionnaire before and at 3-, 12-, and 24-mo intervals after implantation of an IT morphine infusion pump. At each clinic visit, the patient's level of pain was assessed using an 11-point visual analog scale, with 0 = no pain and 10 = worse pain imaginable. The mean initial morphine infusion rate was 0.23 ± 0.14 mg/day (with a range from 0.09 to 0.75 mg/day) and was subsequently adjusted to maintain their pain score at a value <50% of the initial value. Adverse side effects and complications, as well as activity levels, were recorded at each clinic visit.

RESULTS: Both evaluative and affective components of the pain assessment demonstrated a significant improvement over the 24-mo study period. The evaluative component of the McGill Pain Questionnaire improved 66%, the affective component 59%, and the sensory component 32%. The average morphine infusion rate increased to 0.44 ± 0.29, 0.66 ± 0.39, and 0.80 ± 0.45 mg/day at the 3-, 12-, and 24-mo follow-up intervals ($P < 0.05$). The reduced level of chronic pain leads to improved social, work, and family relationships and quality of life. Among 13 patients of working age, 12 returned to work full time, and among 17 retired patients, 14 had a reduced need for assistance.

CONCLUSIONS: IT infusion of morphine using an implantable pump was helpful in improving psychosocial function in patients with intractable pain that had failed to respond to standard multimodal analgesic therapy.

脊髓背側角 Homer1 蛋白的早期改變與寬鬆結紮大鼠坐骨神經相關

Early Changes in Homer1 Proteins in the Spinal Dorsal Horn Are Associated with Loose Ligation of the Rat Sciatic Nerve

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背景：脊髓背側角的可塑性被認為至少是外周神經損傷後疼痛行為的部分基礎。Homer1 蛋白通過功能依賴性突觸後密度的重塑在突觸可塑性中起重大作用。在這項研究中，我們測定了寬鬆結紮坐骨神經後早期脊髓背側角神經元突觸後密度中 Homer1a 和 Homer1b/c 蛋白的水準。

方法：雄性大鼠隨機分入對照組、模擬手術組和坐骨神經結紮組。在坐骨神經暴露或結紮 4 小時後麻醉或處死動物。將脊髓背側角同側和對側的 1/4 進行同質加工處理並離心，提取含突觸後密度的 LP1 成分。用 Western 印跡法確定 Homer1 亞型。在一些動物中，術前鞘內注射 Homer1 小干擾 RNA 、非目標小干擾 RNA 、MK-801 或 U01026 來評估這些處理對 Homer1 亞型水準和損傷相關疼痛行為 2 種徵兆（承重分配的移位和熱痛覺過敏）的影響。

結果：在坐骨神經結紮的動物中，結紮同側脊髓背側角 LP1 成分中 Homer1a 蛋白水準增加而 Homer1b/c 蛋白水準降低，相反，結紮對側和模擬手術動物的兩側蛋白水平均無改變。結紮前 2 小時鞘內注射 Homer1 小干擾 RNA 而非非目標小干擾 RNA 能阻止同側 LP1 成分中 Homer1a 的聚集和 Homer1b/c 的流失。相同的預處理也能減輕結紮動物承重行為移位和熱痛覺過敏。結紮前 15 分鐘鞘內注射 MK-801 或 U0126 同樣能抑制 Homer1 蛋白損傷相關的改變和疼痛的行為表現。

結論：同側脊髓背側角神經元突觸後密度中 Homer1a 和 Homer1b/c 蛋白水準的結紮相關改變可能是損傷相關重塑的重要早期反映，這種重塑經過一定時間將導致持續性疼痛的產生。

（朱蘭芳譯 薛張綱校）

BACKGROUND: Plasticity in the spinal dorsal horn is thought to underlie, at least in part, pain behavior after peripheral nerve injury. Homer1 proteins play an important role in synaptic plasticity through an activity-dependent remodeling of the postsynaptic density (PSD). In this study, we examined the early consequences of the loose ligation of the sciatic nerve on the levels of Homer1a and Homer1b/c proteins in the PSD of spinal dorsal horn neurons.

METHODS: Male rats were randomly assigned to control, sham-operated, or ligated groups. Four hours after sciatic exposure or ligation, the animals were anesthetized and killed. Dorsal horn ipsilateral and contralateral quadrants were homogenized and centrifuged to obtain a PSD-containing LP1 fraction. Homer1 isoforms were identified in Western immunoblots. In some animals, Homer1 small interfering RNA (siRNA), nontarget siRNA, MK-801, or U01026 was injected intrathecally before surgery to assess the effects of this treatment on the levels of Homer1 isoforms and on 2 signs of injury-associated pain behavior, a shift in weight-bearing distribution and thermal hyperalgesia.

RESULTS: In ligated animals, the protein levels of Homer1a increased and those of Homer1b/c decreased in the ipsilateral LP1 fraction of the spinal dorsal horn. In contrast, no changes were detected in the contralateral LP1 fraction of ligated animals or the ipsilateral or contralateral LP1 fraction of sham-operated animals. Intrathecal injections of Homer1 siRNA, but not nontarget siRNA, 2 h before the ligation prevented the accumulation of Homer1a and loss of Homer1b/c in the ipsilateral LP1 fraction. The same pretreatment with Homer1 siRNA also alleviated both a shift in weight-bearing behavior and thermal hyperalgesia in the ligated animals. Intrathecal injections of MK-801 or U0126 15 min before the ligation similarly prevented the injury-associated changes in Homer1 protein levels and the behavioral signs of pain.
CONCLUSION: The ligation-associated changes in the protein levels of Homer1a and Homer1b/c in the ipsilateral PSD of spinal dorsal horn neurons may be an important early reflection of the injury-associated plasticity that in time leads to the development of persistent pain.

超聲引導下刺激腓深神經誘發運動反應

Ultrasound-Assisted and Evoked Motor Response Stimulation of the Deep Peroneal Nerve

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背景：我們觀察了志願者超聲應引導下行腓深神經阻滯的效果。
方法：16 名志願者兩個腳行腓深神經阻滯。通過超聲觀察動脈及腓深神經的位置並行神經刺激。在注射局麻藥前記錄運動反應和/或感覺麻痹的反應情況。
結果：任何可以誘導出運動反應（蹠伸或足背及外測肌肉收縮）或感覺異常地定位均可以使第一第二腳趾感覺完全阻斷。
結論：通過超聲引導下定位腓深神經，可以誘導運動及感覺異常，由此可以成功地行腓深神經阻滯。
（陳珺珺譯 薛張綱校）
BACKGROUND: We performed an observational volunteer study to document an ultrasound-guided evoked motor response blockade of the deep peroneal nerve.
METHODS: Sixteen volunteers had deep peroneal nerve blocks in each foot. After visualization of the artery and the deep peroneal nerve with an ultrasound, the nerve was stimulated with a nerve stimulator. Evoked motor responses and/or paresthesia were noted before injection of the local anesthetic.
RESULTS: Any evoked motor response (extension of the toes or muscle contractions on the dorsum of the lateral aspect of the foot) or elicitation of paresthesia resulted in complete sensory blockade of the web between the big toe and second toe.
CONCLUSIONS: Visualization of the deep peroneal nerve with ultrasound followed by elicitation of an evoked motor response, or paresthesia, predicts successful blockade of the deep peroneal nerve.